

## User Lists Benefits of Mixed-Vendor Systems

By Nicholas J. Suszynski Jr.  
Special to Computerworld

It is fair to say that until the advent of plug-to-plug compatible devices, a typical ADP user was subjected to marketing strategies of a supplier who packaged computer systems so as to increase his profits.

These practices obviously made much sense from the viewpoint of the company's stockholder, but it did not allow the computer user to wisely invest the revenues allocated to DP equipment.

Consider IBM's 360/30 user who is quite satisfied with his peripheral devices and whose mix of work makes his installation memory bound. This user

### Spotlight on User's Lib

In previous articles, CW has reported the results of surveys and interviews with users of mixed-vendor systems. In this article, Nicholas J. Suszynski Jr., a user and advocate of mixed-vendor systems, tells it like it is in his own words.

knows he could get a better balance between the central processor and input/output if he could extend his memory beyond IBM's upper limit of 96K (until recently 64K).

If the user deals only with IBM, he must either obtain a bigger single machine (such as a 360/40) or perhaps lease a combination of two smaller computers: in any event, it is economically a less desirable choice than increasing the memory to, say, 128K. Today, however, the user can obtain the added main memory from at least 14 sources outside of IBM.

If the user deals with vendors of plug-to-plug compatible equipment, he can save on a per-device basis anywhere from 10% to 35%, and in some cases even higher. As far as I know, he will also receive unlimited usage contracts from all these vendors which will

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## Data Concentration

With April 15 just around the corner, the Internal Revenue Service centers at Andover, Mass., above, and elsewhere are ingesting tax forms with a voracious appetite. Have you filed your 1040 yet?

## Dossier Data Banks

## U.S. Admits 'Overzealousness'

By E. Drake Lundell Jr.  
Of the CW Staff

WASHINGTON, D.C. — The Army has been "unwilling or unable" to ensure the complete elimination of information it compiled in its data banks on civilian dissent, Sen. Sam J. Ervin (D-N.C.) charged before the Supreme Court last week.

Ervin, arguing in the case of *Tatum v. Laird* [CW, March 15] before the court, charged that the data bank operations of the

Army were "overboard in concept, . . . not controlled in operation, and . . . have provided the military with no assistance of any value to the efficient performance of statutory duties."

Arguing for the government, Solicitor General Erwin N. Griswold said the case challenging the constitutionality of Army surveillance and data bank operations should be dismissed because the data bank activities have stopped, but he did admit that the Army had been "overzealous" in its surveillance of civilians.

Ervin and Frank Askin, lawyer for the plaintiff (Tatum), argued that Army data bank activities have a "chilling" effect upon citizens exercising their First Amendment rights to freedom of speech and assembly.

### 'Not Necessary'

In a full brief filed with the court, Ervin charged that even senior officials of the Defense Department have admitted the Army data banks have not "been necessary or helpful."

"These officials apparently did not know how many computers

were involved, what information was being collected by the Army, and indeed who was actually collecting it," Ervin charged.

At the height of the program, Ervin said, the Army operated at least four computer centers with dossiers on civilians.

(Continued on Page 4)

## Service Pledged on 256K 30s

By Frank Piasta  
Of the CW Staff

WARRINGTON, Pa. — The only independent vendor to offer 256K bytes of core on an IBM 360/30 is prepared to maintain any mainframe equipped with its memory extension if problems with IBM service arise.

Computer Hardware & Consultants (CHCS) has also announced the availability of the 4768 double-size (512K) 360/40 memory, that may save the user up to 70% on a purchase basis, in addition to the quadruple-size 3768 for the 360/30.

Under a tentative agreement

with IBM, according to George C. Melrose, CHCS president, CHCS will be treated like any other memory manufacturer. CHCS feels, however, that important points in the agreement remain unresolved, Melrose said, notably a precise definition of the "best efforts" phrase used in the court-approved agreement between IBM and Intel [CW, March 29].

IBM did make clear, Melrose said, that all mainframe attachments must be housed outside the mainframe and in the add-on memory cabinet to facilitate IBM maintenance.

Melrose said that existing mem-

ory installations would not be changed to conform with this specification, and indicated that his company could undertake the CPU service if needed.

Performance of the core units matches or exceeds that of the IBM memories they are designed to replace and extend, the manufacturer said. Cycle time is 2.5  $\mu$ sec.

The price of the 4768 for a 256K byte upgrade is \$103,000. The one-year lease cost of the unit is \$4,020/mo with longer-term leases available. Maintenance adds \$120/mo in either case. Delivery is 45 days from 1409 Easton Road, 18976.

### On the Inside

Interest Groups  
Essential to Sharing

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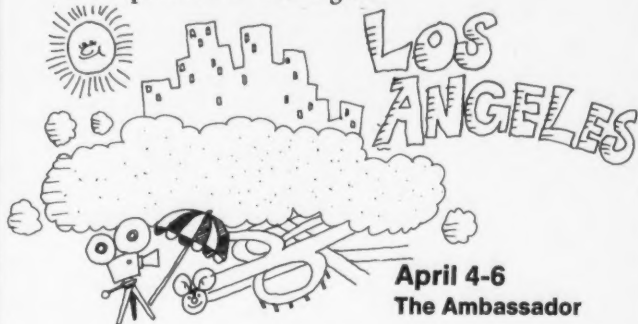
Memory Makers Hail  
Maintenance Win

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### Dr. Davis Argues

## Base Standards on Public Interest

By Don Leavitt  
Of the CW Staff

CAMBRIDGE, Mass. — The computer industry is changing from a product orientation to one of service. While this makes the development of standards based on hardware difficult, it also makes the development of standards based on public interest increasingly important, according to Dr. Ruth N. Davis, director of the Center for Computer Sciences at the National Bureau of Standards.

An effort started by various organizations during the late 1960s, to develop mainframe-peripheral interface standards, was finally abandoned, Dr. Davis said, when it became apparent that such a project, if completed, would tend to strengthen the status quo, while harming competition and innovation.

Dr. Davis made these points during three lectures she gave recently at Harvard University on the subject of computer science and technology and its interaction with public policy issues.

Rather than hardware standards, largely impor-

tant to a product marketplace, the industry should prepare "ground rules" appropriate for a service environment, according to Dr. Davis.

Standards for quality control in the production of software and for true performance measurement of hardware and software should be developed by some group, ideally outside the government, Dr. Davis said.

The U.S. government can develop or impose standards on any sector of the economy, Dr. Davis stated, including the computer industry, if it deems such rules in the interest of public welfare and protection.

Though NBS "probably shouldn't be the vehicle," the public interest would be served, in Dr. Davis' view, if an organization within industry could quantify standards for using computers to:

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- Improve the rate of learning in educational processes.
- Avoid worker boredom in automated assembly lines.
- Decrease the danger to law enforcement officers.

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## Senator Blasts U.S. Computer Technology For Prolonging War

WASHINGTON, D.C. — Computer technology is allowing the U.S. to maintain its "destructive presence" in Southeast Asia even though ground troops are being brought home, Sen. Mike Gravel (D-Alaska) charged last week in the Senate.

Gravel said the "gradual refinement of the automated battlefield and its sensor and computer-directed bombing have raised the stakes in Indochina.

"We cannot let this go on," he added.

In the system referred to by Gravel, sensors are dropped from aircraft flying above Vietnam, Cambodia and other areas in Indochina.

When the sensors detect the presence of movement, they transmit this information via an orbiting aircraft to a computer system which then schedules bombing attacks on the area.

"The movement could be a cow or a four-year-old child as far as the sensors and computers know," according to an aide to the senator.

These types of systems have caused "an Orwellian transformation in our military policy in Indochina," Gravel said in introducing a bill that would call for the end to U.S. involvement in the area.

"Due to public pressure American ground troops are slowly coming home, but they are leaving an automated war behind," Gravel said.

"Computer technology and a small number of troops manning aircraft and artillery are creating a U.S. destructive presence that may literally hover over Southeast Asia for years to come," he added.

## Study Says Managers Lack DP Knowledge

NEW YORK — With a better understanding of computers, top management, "in general, would be able to carry out its responsibilities more effectively," according to a study by the American Management Association (AMA).

Although only 8% of the recipients of a mail questionnaire replied to the survey, almost 90% of those recipients urged a "better understanding of computers" by top management.

The study was mailed to about 3,000 DP executives and 4,000 general management personnel; 577 replies were returned, AMA reported.

The results confirmed user concern about the need for top management involvement in information systems functions, which has been a "point of rhetoric since the first computer was installed in a business," the report noted.



## Stress on Education Also Pays Off

# Interest Groups Essential to Pooling of Resources

By Molly Upton  
Of the CW Staff

EUGENE, Ore. — An increasing number of users are banding together to share their DP resources, as they attempt to realize economies of scale and avoid "re-inventing the wheel."

Although many seek one pat answer to setting up and running a shared DP facility, success seems to be determined by the makeup of the participating organizations.

Problems also tend to be of an individual nature, since the sharing effort depends largely on the people involved.

Sharing comes in many forms, and definitions vary. Some share programs, some share people and facilities, some just equipment. Government and hospitals are particularly active in sharing. "Many tend to think there is a tradeoff between a DP dictatorship in a stand-alone environment versus the democracy of a shared environment, but after 12 years in the business, I'm beginning to realize that start to finish time may not be that much different," remarked Al Cusick, manager of Medistat, a cooperative DP project among Wisconsin Blue Cross and five hospitals.

"When you work with a democracy, you usually end up counting all the bases, getting all the pros and cons rather than a tunnel vision approach from a dictator," he said.

"You realize you aren't going to computerize everything by brute force all by yourself. There's going to be some way of sharing developments," noted Paul Weber, DP manager of Lane County, a seven-year-old shared facility in Oregon.

The Lane County unit now comprises Lane and Linn counties, the cities of Eugene, Springfield, Albany and Cottage Grove, as well as utilities in the area.

The center uses an IBM 370/155 with 85 on-line terminals, and offers 250 programs on-line. About 35,000 to 50,000 transactions are done each day, noted Weber. Jobs include "every county and most city applications" ranging from property assessment and court records to dog licenses.

Important factors contributing to the success of the Lane Center are the guidance, support and commitment of the Lane County Board of Commissioners, acknowledged Weber.

### DP Education

Other principal ingredients are the strong emphasis on DP education of the user, and the fact that the user agency or department controls its use of the system.

Rather than operating on a service bureau basis, "each user agency or department controls its DP future. There are programmer analysts in each major agency or department who cooperate in using the system," Weber explained.

To eliminate redundancies in program development and broaden the scope of the participants, there are several organizations which meet regularly, including a user's group, an executive committee of municipal executives and a technical management group.

The overall user's group has representatives from each of the technical areas who meet and look at the system as "an overall problem, asking what the needs will be for hardware and software, what will be the best way to process," Weber noted.

"What we're aiming to do is to bring the interest groups together so that they can establish task forces and use resources more intelligently to get the job done on time.

"If their area of expertise is technical DP, then we've got the people with that expertise representing each of the users sitting down together and looking at

where we're going and what our choices ought to be in the future," Weber added.

One special interest group, the financial interest group, is organized around a common budgetary accounting system. It is now looking at joint cost accounting

### Spotlight on Sharing

projects and program budgeting concepts, he said.

The emphasis on user education pays off, Weber said. "The key management people in the county go to school, learn about computers, and because the use of DP by their department is kept under their control, they become expert managers in this technical area.

"They understand fully what the sched-

ule is like, what it takes to get things done, how much effort has to go into it. They can set these in with the rest of the priorities of their own departments. This has helped our whole management level, and our whole management level has helped this to work," Weber affirmed.

### Control Necessary

Although the system, with its 155, is large enough to handle a heavy job load, "that is not to say there isn't a control function necessary. You have to have some way to apply this resource to the needs and keep some control so that we can avoid the potential of one user hurting another user and so that we can truly share resources by sharing data and programs," explained Weber.

Programs as well as data are shared in some instances. The criminal justice infor-

mation system being built by all the agencies involved will share a common data base. A large property data base is being shared by the cities and counties.

There is also interaction with state agencies. A cooperative effort between the Oregon Department of Revenue and the two counties involves development of a model package for county assessment taxation.

But problems do occur. "It takes some time to resolve problems, but we have satisfied users. We have people who are pleased to be doing what they're doing," Weber said.

Billing is worked out "very carefully and fairly," according to Weber, with users paying for time used and percentage of the staff and system costs. Development costs are under local control, as each agency has its own DP personnel.

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## Certification Would Protect Public

(Continued from Page 1)

Afips said.

"While pointed primarily at large computer-based systems" with extensive data bases, the methodology "will also have application to smaller systems," Afips added.

Gosden said the project will be pointed "towards developing professional solutions" to problems "caused by the maldesign or malfunction of computer-based information systems."

"Solutions will be based on the principle that prevention is better than cure," he continued, "and will be designed to lead to a set of definite systems standards, or code of good practices, and eventually to the certification of systems."

Taking note of other professional groups seeking to establish codes of practices, particularly the Society of Certified Data Processors, Gosden agreed that the goals are the same as some of these groups, but the approach is different.

SCDP, for example, "wants people to certify systems," he agreed, while the Afips project seeks to have systems "certifiable." The result, he indicated, would be a combination of the two approaches, and not a "compromise."

### 'Concern Over Regulation'

Uncapher said the program would help the computer field meet its overall responsibilities.

It "reflects the concern of many EDP professionals that if our industry does not take appropriate action, it may expect increased regulatory activities to insure protection of the public interest."

Afips hopes to interview individuals interested in furthering the program during the Spring Joint Computer Conference in Atlantic City, May 16-18. In that regard, responses to the RFP are requested by May 10.

Copies of the RFP can be obtained from Afips Executive Director Bruce Gilchrist at headquarters, 210 Summit Ave., 07645.

The first system review manual (SRM) is expected to be drafted and reviewed this year, and tested during 1973, Gosden said.

"Supplementing this," he added, "we intend to develop future SRMs covering such topics as acceptance tests, opera-

tional audit, performance review, data collection and system reliability."

Rather than providing all the answers, the manuals will establish checklists for users and designers to follow, in evaluating systems.

The suggested approach would encompass three sections — ideal concepts, questions to ask and mistakes and consequences to avoid.

For each "mistake," Gosden related, there should be "at least one question which, if asked, would help determine if a system were defective."

Each question may be generalized or suggest other questions; for each ideal concept, there should be a general list of related questions, he continued.

Uncapher predicted the efforts would have a "major impact on the quality of automated systems," through the correction of systems design weaknesses.



## Caravan Moves On

Last-minute packing of exhibitor forms and brochures, plus office supplies for the traveling headquarters of the Computer Users' Forum and Exposition, marks the Caravan's exit from Dallas. The trucks made the trek to the Ambassador Hotel in Los Angeles, where the conference is this week. A Monday to Wednesday schedule will be used in San Francisco next week to give the Caravan an additional day to travel to Chicago.

(CW Photo by E.J. Bride)

## A Console for Everyone in 1990 Net?

WASHINGTON, D.C. — Developments in information technology can achieve a higher form of free enterprise, a more informed citizenry participating directly in decision-making and vast improvements in business and fields of human creativity, according to Dr. Simon Ramo of TRW.

Speaking to a White House Conference on the Industrial World Ahead, Ramo predicted a situation in 1990 in which "almost everyone involved will have at least a small console to tie him into the information network."

"This will enable human managers in business to operate

closer to total awareness and control. New man-machine relationships will free the human partner to rise to higher plateaus of judgment, creativity, decision-making, social and cultural attainments," he said.

Massive startup costs will be involved and will require "billions of dollars, with many more billions at risk for years before turnaround into a profit period," he said.

"The government may need to sponsor large-scale experiments to develop the basic ideas, perhaps seeking improved information flow in government operations as a first proving ground," Ramo said.

## Army 'Overzealousness' Admitted

(Continued from Page 1)

The centers were at the headquarters of the Intelligence Command (Fort Holabird), the Continental Army (Fort Monroe), the Third Army Corps (Fort Hood) and in the Pentagon.

"More than one computer data bank was maintained in some of these locations," Ervin added.

The case before the Supreme Court was initially dismissed by

a Federal District Court before it was heard. Later the Court of Appeals reversed that decision and ordered the case aired. The government appealed that decision to the Supreme Court.

After the arguments last week, the court took the case under advisement and is expected to announce its decision in "a few months," according to one source here.

## News Wrapup

### Firms Wrestle With Software Tax

LOS ANGELES — Faced with increasing uncertainty about the tax status of their computer software, hundreds of firms in Los Angeles County struggled to beat the April 1 deadline set by the county assessor for reporting on the value of computer software and supplies.

A number of firms unable to meet the deadline were given extensions by assessor Philip E. Watson, who had requested reports on the value of software for sale, lease, or developed or acquired as part of a plan to assess it as taxable personal property.

But the plan by Watson may never materialize if the state legislature acts favorably when it reconvenes this week on proposed legislation which would exempt practically all software from taxation.

### Defendant Says Not Guilty in Theft Case

LOS ANGELES — Jerry Neal Schneider, president of a communications equipment firm, has pleaded not guilty to charges of stealing nearly \$1 million worth of supplies from Pacific Telephone Co.

Schneider, 21, pleaded not guilty to charges of grand theft, burglary and receiving stolen property. Arraigned in Los Angeles County Superior Court, Schneider was scheduled to stand trial May 22.

Schneider was arrested Feb. 8 after a search by county investigators at his Los Angeles Telephone and Telegraph Co. firm.

Investigators said Schneider was able to crack Pacific Telephone's computerized ordering system.

### Bugs Delay State Income Tax Refund Checks

ST. PAUL, Minn. — Taxpayers will probably have to wait a few more weeks until they receive their state income tax refund checks.

That's the word from the state tax commission office which acknowledged that reprogramming errors and the switchover to the new computer system last fall caused the delays in mailing thousands of the checks.

Thousands of refund checks are being rechecked while technicians work out the bugs.

### Fla. Fails to Test On-Line Voting Plan

TAMPA, Fla. — On-line voting by using Touch-Tone telephone input to Hillsborough County computers here was not tested in the Florida primary, because of a combination of technical, administrative and financial factors.

A test had been planned for three of the county's 109 precincts [CW, Oct. 6, 1971], but was postponed because expansion would have been costly, if indeed possible, according to Richard Robinson, manager of systems and programming for the county.

Robinson said Florida law requires votes to be counted at each precinct, rather than at the county seat. It therefore might have been necessary to have a minicomputer at each of the precincts, and 109 lines to the county's 370/145, in order to satisfy the law.

### Overdue Tickets? Try Getting Inspected

MEMPHIS — The city has agreed on a program that would deny motorists with overdue traffic tickets an inspection sticker when they visit automobile inspection stations.

When automobiles enter the inspection line at the testing station, license plate numbers will be fed into the computer. Motorists identified as having unpaid traffic tickets will be asked to pay and will be denied an inspection sticker if they refuse, according to William C. Boyd, city public service director.

The system is expected to be implemented by January of 1973.

### DP Center Plans Earth-Shaking Move

HONOLULU — University of Hawaii officials are planning to move their \$4 million computer center to another building because they fear possible damage from an earthquake. Small cracks appeared in the concrete floor of the center in 1970.

The center director, Walter Yee, said the planned move was also prompted by the need for more space.

Yee said the number of people using the IBM 360/65 and its satellites will probably grow from the present 5,000 a day to as many as 20,000 a day in the next five years.

### Model to Predict Pollution at Airports

CHICAGO — Researchers at Argonne National Laboratory are collecting air pollution data on jet planes, airport service vehicles and auto traffic through the airport area to find new ways of building less-polluting airports.

The laboratory is undertaking a \$220,000 study of air pollution at O'Hare Airport to determine how the size of the airport, the number of flights, weather and other factors affect the amount of pollution from the airport.

When these factors are put into mathematical relationships and programmed, predictions will be made from the model to show how much pollution any size airport will produce under any conditions.

### He Must Be Foreign ... He Speaks Fortran

LAS CRUCES, N.M. — The University of New Mexico's School of Art knows a good thing when it sees it, and that's why it recently added computer science and computer graphics courses to its curriculum. Art students now can satisfy their foreign language requirement by taking Fortran.

The impetus for the course additions came from a university art educator, Charles Mattox, who wrote two programs on a 360/67 to execute artwork from mathematical characteristics of designs selected by the students.

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## Federal Information System to Update Personnel Procedures, Promises Privacy

Special to Computerworld

WASHINGTON, D.C. — A computerized information system to protect the privacy of the government's nearly three million employees and streamline personnel procedures is being developed by the Civil Service Commission (CSC).

By fiscal year 1974, the CSC plans to have a prototype ready for testing in a yet-to-be determined federal agency, Victor J. Cavagrotti, information systems director for the CSC, said.

If all goes well, the CSC, which is the government's personnel manager, will probably begin feeding the system slowly to some 100 departments and agencies. Only 38 agencies can now provide computer-ready personnel information to the commission, Cavagrotti said.

By July 1, Cavagrotti expects the government to have the first guidelines ready for agencies to follow in preparing data. For those agencies without computer capabilities, Cavagrotti said the CSC could establish a service bureau to do the job.

Cavagrotti said CSC system designers are working on methods to "provide better information for decision making in government" and "improve the information flow to federal workers." Cavagrotti said improved methods are needed "to keep track of personnel actions and to maintain records."

With standardized record-keeping procedures, the government will be able to review data quickly and process it to obtain vital information.

### Placement Tool

As a placement tool, a federal executive could use the system, for example, to find a grade 7 secretary with a superior rating, between age 30-35, who could type 70 word/min. From the printout, he could select his secretary.

The U.S. spends about \$100 million a year for personnel record keeping, transaction processing and reporting, and there is difficulty in handling the growing paperwork.

The CSC's developing Federal Personnel Management Information System (FPMIS) will help federal managers determine the character, mobility and patterns of the workforce, Cavagrotti said.

The government will also be able to keep tighter controls on the growth of the federal pay grades and hold them within desired limits. This means a more efficient use of manpower, he said.

The system includes the central personnel data file (CPDF) which will contain 27 (basic information) elements of data on every employee and will be implemented this July. The file will be set up through the collection of the elements by automated submissions, where possible, or by hand copy paper submissions where adequate computer files exist.

CPDF will be used to produce various annual reports now required of the government on pay, occupation and skills of the federal workers, and special reports on employment trends, retirement, legislation and other needs will be distributed, Cavagrotti stressed.

### Qualification File

The system will also allow the CSC to maintain a qualification file of continuing job information on some 80,000 GS-13 and 14 level employees. In the data banks will be data on each member of this group so persons can be spotted and groomed for higher management positions. Through this talent pool, Cavagrotti said the government will have a better method of selecting people for important assignments.

As FPMIS is built, the CSC is developing safety features to protect "the rights and privacy of individuals," Charles J. Sparks,

director of the commission's bureau of manpower information said.

"We have developed methods to control access whereby those with only a need to know can tap FPMIS data," Sparks said.

Sparks said employees will be allowed to verify data about themselves and update or correct their records. He said he was confident FPMIS will satisfy the privacy aims of Congress and others concerned with the privacy issue.

### 'Computer Edited'

All data, Sparks said, fed into the system will be "computer edited" to insure accuracy. Incomplete data will be returned to the source for correction. The CSC will "make an exhaustive edit of material to insure accuracy," Cavagrotti said.

He said the "go or no go decision" on the system will come after 1974 when FPMIS is tested.

FPMIS is being developed in-house by the CSC by three federal experts with two RCA Spectra 75/45s.

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He's not a repairman (sometimes called a customer engineer); he's a man that knows computers and computer equipment.

To us he is a specialist. To you he could be a godsend.

Our specialist saves you the cost of supporting a large field staff. And your customers get the benefit of fast service.

If there's a company, that's nice company to be in.

For details call Chuck Olano at 609-235-7300. Or write to him at GTE Information Systems, Service Division, East Park Drive, Mt. Laurel, N.J. 08057.

**GTE INFORMATION SYSTEMS**

### Mr. T.V. Who?

HONOLULU — The branch office of TV Guide here receives its subscription to Readers Digest regularly each month, addressed by computer to Mr. T.V. Guide.



# Scrimping can be expensive.



Stop scrimping and start saving.  
Get Epoch 4.

It's smart to spend enough to get the job done right the first time. Every time.

That's the whole philosophy behind Epoch 4.

Sure Epoch 4 costs a little more than other tapes. But it's an investment that'll pay for itself. Because Epoch 4 is 50 times tougher than conventional tapes. So it can cut handling damage and dropouts by 50 per cent.

And because it's the only tape in the world with a 20-year warranty.

Think about it. Dropouts errors and the resulting time delays can cost you more than you'd ever save on "bargain-basement" tape.

So while Epoch 4 costs a little more it's probably the biggest bargain in the business.

See your man from Graham Magneics. He'll show you how to stop scrimping and really start saving. With Epoch 4. The best there is.

**GRAHAM  
MAGNETICS**  
GRAHAM, TEXAS 75045

## Proven Advantages

# Independents Should Prolong 360 Life

(Continued from Page 1)

further lower his costs.

Expansion of main memory or an addition of large core storage is as much of a peripheral device as, for example, a large capacity disk. In fact, some users call disk drives "rotating memories." This is mentioned because somehow many view core memory as less of a replacement or an add-on than a tape drive or a printer.

### Airline Model

A good example of what we as users can do is given by the DP installation at United Airlines in San Francisco. The airline had a 360/50 and a 360/65 there, each with 512K memory. Memories of the same size were required since the 360/50 serves as a backup machine for the 360/65. In mid-1971, United decided to install a 1 Mbyte extended core memory which can be switched between both computers. The net effect on the throughput was almost equal to another computer of 360/50 class for an equivalent of \$3,000/mo in rental.

Since United's operating system requires 200K, its 360/65 was initially able to run only three regions in multiprogramming; now it runs nine regions. Two of these regions are dedicated to debugging and their turnaround time has been cut in half, so that tangible benefits are also noted in the productivity of the programming staff.

### Other Alternatives

United obviously had several other alternatives in addition to obtaining large core storage. It could have upgraded the 360/50 to a 360/65; it could have increased the main memory size in both machines; or it could have acquired a third computer in the same configuration as the previous two.

The economics of the situation determined that LCS be installed, since the only other satisfactory solution would have been to upgrade the 360/50 to a 360/65 with concurrent extension of both memories to 750K. In terms of monthly costs United's decision meant \$3,000 versus \$30,000 in favor of LCS.

The time is past when the users had to be extremely concerned whether a given manufacturer had the engineering know how to design or fabricate his devices. With some minor exceptions, the majority of today's equipment will perform up to, or very close to its specifications. Acceptance testing should be able to determine this with little or no difficulty.

### What Kind of Enterprise?

The major task in the selection of a supplier of peripheral equipment is assessing the vendor in terms of his image of himself — whether he considers his company primarily a manufacturing enterprise or a service enterprise. I would strongly recommend to avoid the former and seek the latter. The company with service orientation has not only adequate customer support in terms of spare parts and service personnel, but also greater empathy with the user and is more likely to respond satisfactorily to his needs.

It is not unusual to find, for example, that the maintenance provided by these vendors is not only adequate, but is more flexible and responsive than that supplied by the mainframe manufacturer. Numerous vendors of tape drives, for example, will provide their customers with on-site maintenance if they lease seven or more tape units plus their controller.

Our installation has three vendors, one of whom is the mainframe manufacturer. In our experience, the best service is provided by the vendor of the tape drives and not by the mainframe manufacturer as one normally would expect, especially in Washington, D.C., where there is a

large number of service personnel and a large supply of spare parts.

### Why Go Independent?

Advantageous prices and better service are not the only reasons why one should consider independent manufacturers of peripheral devices. Often, as a result of outstanding engineering and innovative design, one can obtain a superior device in terms of reliability, transfer rates and access time.

There are also instances where independent manufacturers are the only sources of a given capability. For example, only independent manufacturers, in a routine manner, offer expansions of System 360 core memories beyond those initially offered by IBM; today, one can have a 360/30 with 128K, a Model 40 with 512K and a Model 50 with 1,024K. All of these are double the memory size normally associated with IBM-installed equipment.

Nothing, however, is gained without some cost; as usual, it is a question of certain tradeoffs. For one thing, a user with a multi-vendor installation must perform the function of a systems integrator, which until now he relegated to his sole source supplier of computing equipment: all of a sudden, the user finds himself the referee between the mainframe manufacturer and vendors of disk or tape subsystems. The game of finger-pointing may develop.

This is especially true of the vendor who attempts to defend his position. In most cases, the uncooperative vendor is the mainframe manufacturer: he is in a defensive position since more often than not your installation will be turning back some of his equipment. He is likely to attempt to apply pressure by withholding certain portions of his up-to-now "free" service.

Or, perhaps, he may hint his software support may not be as readily available as it was in the past. I believe these and similar impressions will be conveyed by his salesman to you. In practice, however, service is not likely to suffer if you are a good manager, and your contracts spell out in detail who, what, where and when with every vendor of your equipment.

Just as in Robert Frost's poem, the farmer believes that good fences make good neighbors, I should like to say that well spelled-out and tight contracts make for happy and satisfying relationships between the vendor and the customer.

Before entering into a purchasing or a leasing arrangement, it is most important for the user to take time to include in the terms and conditions of his contract everything he considers significant concerning the usage of equipment he is prepared to acquire. Do not leave out what you may consider obvious. It may be obvious to you or to both parties, but at some future point your only recourse which will be backed up in courts is that which you can produce in writing.

I am sure that much bad blood and some lawsuits could have been avoided if both parties clearly understood what was expected.

### Inadequate Contracts

Standard computer contracts offered by the equipment manufacturers generally do not address themselves adequately to the time frame in which to meet their obligations. The "when" of it is usually loosely stated and more often than not contains various provisions and references to the acts of God, etc., which tend to take the manufacturer off the hook if he is unable to live up to often vague commitments.

A recent article in *Datamation* on contract specifications quotes GE's boiler plate from its standard contract, which

for all intents and purposes nullified GE's delivery commitments in the body of the contract, simply by including the following paragraph:

"Seller shall not be liable for delays in delivery or failure to manufacture or deliver (1) due to causes beyond its reasonable control, or (2) to acts of God, acts of the buyer, acts of civil or military authority, priorities, fires, strikes, floods, epidemics, war, riots, delays in transportation or car shortages, or (3) inability due to causes beyond its reasonable control to obtain necessary labor, materials or manufacturing facilities, or (4) delays in engineering or manufacturing occurring notwithstanding due diligence on the part of the seller, nor for delays occurring by reason of changes, or unavailability of facilities-information, or material to be furnished by the buyer. In the event of any such delay, the date of delivery shall be extended for a period equal to the time lost by the reason of the delay." How is that for playing safe?

We as consumers uniformly take care of and generally examine terms and conditions associated with virtually every personal purchase over, say, \$50, yet when it comes to computers, which cost our employers more, we sign contracts with all of the vendor's built-in defenses as demonstrated in GE's contract.

Perhaps part of our problem lies in the fact that most of us have no legal training; one of the most important functions you can perform before recommending the contract be accepted is to have your lawyer go over it. Better yet, consider involving the lawyer as early as when preparing performance standards for your requests for proposal.

For example, when leasing or buying either hardware or software, if your contract does not include a clause stating the supplier accepts the responsibility for the patent or copyright infringements, you may find yourself someday in a position of having to pay damages for patent or copyright infringement, as well as giving up the use of a product you thought belonged to you.

It is not enough to have a contract with terms and conditions unless these have the same meaning for both parties.

Above all, be specific, and, if necessary, provide a glossary of terms used in the body of the contract, making them part of your contract. Spell out "what" you are buying and "how" you are buying it, or on what conditions you accept their product. If you agree to a 98.5% uptime for a device over a period of one year you may find this is not specific enough. Every installation has its upper limit of downtime that it can take all at once.

Can you take a downtime of 30 consecutive hours? If you can't, you had better spell out what happens if it occurs. Make sure there are compensations for you in such a case (include a clause on liquidated damages). Remember not to attempt to include penalties in a contract — they are not enforceable — and any liquidated damages must bear a close relationship to the actual loss.

After reviewing various proposals, and before deciding on a vendor to supply the equipment, again check the advantages, costs and risks associated with each vendor. It is imperative that each vendor, once selected, shall agree as a part of a contractual obligation:

- To assume the liability for any damage to IBM's equipment due to malfunction of its gear.
- That in cases of a faulty diagnosis on its part, while it is its own equipment which is malfunctioning, any IBM billing would be rebilled to the vendor of the peripheral device.
- That in those rare cases where the

(Continued on Page 7)



## Independents Give 360 Line Extended Life

(Continued from Page 6)

whole system is dependent on one device (large memory, for example), the vendor shall agree to pay for the rental liability of all equipment in your installation for the duration of downtime in the excess of some reasonable amount — anything over three hours, for example.

- To include a "quiet enjoyment" clause, especially with third-party contracts so that should the ownership of your leased equipment change, you shall continue to enjoy its usefulness for the duration of your contract.

There are additional benefits to expect in these contracts:

- Basic rental should be substantially lower than IBM's for a device of like performance.

- Ditto for purchase and maintenance.

- Often some rent-free period at the beginning and more often in the last months of rental period.

- Unlimited usage contracts.

- No penalty for upgrading within the vendor's line of equipment.

- More flexible maintenance, subject to initial negotiation. If enough equipment is leased, it is not unusual to have a maintenance man on-site.

- Equipment's performance at least as good, often better, and sometimes with features not available from IBM.

In the past there has been too much of a love affair with the latest equipment from the biggest manufacturer, namely, IBM. The true DP manager of today, the money-maker, is the man who realizes there are many vendors, that these vendors should be examined to see which one offers the best for each unique set of operating problems. He is also aware of his own environment and he tailors equipment to meet these needs.

I think that for the foreseeable future there is still a great deal of appeal in 360s. Their hardware is reliable and easily maintainable while the software has been shaken down, works and is free of cost.

The 370s, on the other hand, are bringing with them costs associated with the lack of familiarity with the hardware, training of maintenance personnel, costs for software (which no longer is free), and eventually some reprogramming of application programs to take advantage of new hardware and the extended instruction set of the new computer itself.

Under these circumstances, all those who suggest moving to 370s should have very good and compelling reasons for their recommendations. In a nutshell, 360s and 370s are quite similar (by design), and aside from the much-advertised 3330 disk drive and the dubious value of the prestige of having the newest equipment, 370s have little to offer in their favor, especially over a third-party lease.

Plug-to-plug compatible devices are providing us with larger memories, better and faster I/O equipment and, in general, make it possible to configure a 360 installation with better throughput than an equivalent 370 for less money. Price/performance ratio of the 360 system, especially when leased over a three-year period, can be less than half of what we would pay by leasing a 370 directly from IBM.

Independent peripheral devices have a proven capability of expanding and updating IBM 360 installations. IBM's System 360 and plug-to-plug compatible devices will dominate the marketplace for quite some time to come, and all users should consider their proven advantages.

N.J. Suszynski Jr. is director, Information Services Branch of the Federal Deposit Insurance Corp.

# Scrimping can be expensive.



## Stop scrimping and start saving. Get Epoch 4.

It's smart to spend enough to get the job done right the first time. Every time.

That's the whole philosophy behind Epoch 4.

Sure, Epoch 4 costs a little more than other tapes. But it's an investment that'll pay for itself. Because Epoch 4 is 80 times tougher than conventional tapes. So it can cut handling damage and dropouts by 50 per cent.

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See your man from Graham Magnetism. He'll show you how to stop scrimping, and really start saving. With Epoch 4. The best there is.

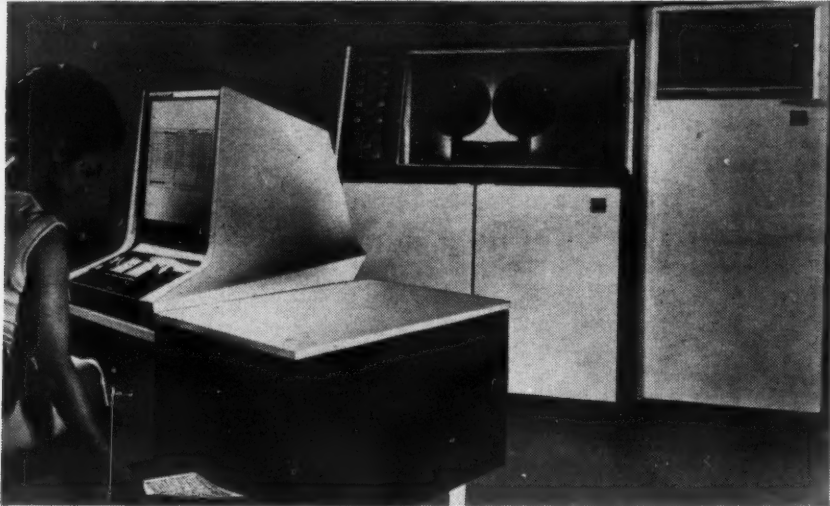
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GRAHAM, TEXAS 76046



## Special Report

## Output Techniques, Part I

# Users Learning COM Not Just Printer Replacement



The Burroughs Bcom is the current model in a line of microfilm systems that date back to the early sixties. Several Burroughs Digiprint units, delivered in 1963, are still in operation at user sites.

## But Lack of Sophisticated Uses Still Impedes Greater Acceptance

*"Anyone that has a lot of data to manipulate and has to retrieve his records often" is a prime candidate for a COM system... "Users are beginning to see the kind of quality that the COM vendors promised them three years ago." — Jim Pyle of Calcomp.*

## Service Bureau Uses 'Hard-Sell' Technique to Attract Customers

*"Most DP people have heard of COM, but you still have to start at ground zero." — Greg Kallos, CMI president.*

While COM service bureaus are a logical first step for users planning to integrate microfilm into their DP operations, the centers have not all been peaches and cream for the user.

One successful COM service operation is Computer Microforms Inc. (CMI) in Kansas City. The bureau serves the COM needs of DP users in a four-state area radiating about 100 miles from its base.

### Getting the Customer

"It takes from six to seven months to convince a prospect that COM services can make his operation more efficient," says Greg Kallos, CMI president. Rather than sitting back and waiting for DP users to beat a path to the door, Kallos talks about a hard-sell situation to bring a new customer on board.

"This business is not booming as so many have claimed," Kallos says. Nevertheless, in three years of operation, CMI is in the black.

As part of its COM service bureau sales pitch CMI will go in and analyze a prospect's DP operation and evaluate systematically how COM can help. "This is where some of our hidden costs lie," Kallos feels.

After initial evaluations, CMI will make a formal proposal to the prospective user. "We like to run a 'demo tape' where possible. If the user will give us a CPU print tape we might return the contents to him in microfiche form with a viewer," Kallos adds. This type of "look/see" approach is usually very effective and also helpful for the user, he thinks.

"Most DP people have heard of COM, but you still have to start at ground zero," Kallos says. DP managers look on microfilm as a foreign technology and this image has to be overcome," Kallos says.

A COM consultant agrees: "Many managers recall visiting a library many years ago and getting eye strain and a sore arm

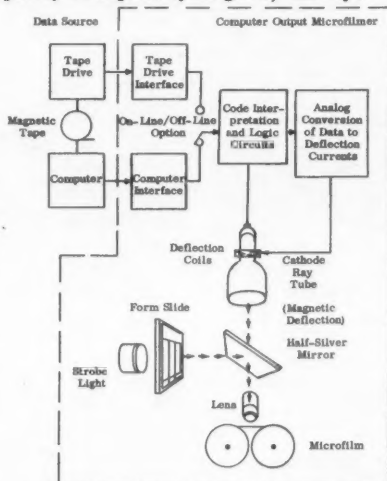
from viewing a roll of microfilm. This has stayed with them and it is how they still equate microfilm."

"We can demonstrate that today's systems are far superior to those the user remembers from his school days," Kallos continues.

Computer Microforms has flexible rates depending on the needs of users. In some cases price is dependent on throughput. Pages full of information will take comparatively longer to process than those with only minimal data per page, according to Kallos. And time is also a factor. "Some customers bring in a job and want to wait for it. Obviously this type of service commands a premium rate," he says.

The CMI service is based on a Kodak KOM-90 system. And to illustrate how much of a "hungry monster" the system is, Kallos says he believes he could conceivably have all possible COM/DP customers in his four-state area without running the system 24 hours a day.

Based on an eight-hour day, Kallos thinks his system is currently running at about 60% capacity. "But this gives us plenty of capability to grow," he says.



A COM system combines computer, CRT and photographic technologies as shown in the Auerbach Inc. block diagram.

By Ronald A. Frank  
Of the CW Staff

Computer output microfilm users often develop applications that were not at first anticipated. And although COM installations are by no means widespread, the number of users is growing.

The lack of sophisticated COM applications is cited by many as a major roadblock still impeding greater acceptance of microfilm. "The technology of COM approximates the level of the 360s and 370s while the applications are still in the 1401 era," one observer said. Part of this problem may be traced to the DP user who often approaches COM as an output system that will operate as a mirror image of a line printer.

### COM for Whom?

Applications areas which can benefit from the installation of a COM system include management information reports; computer-generated data bases such as catalogs, directories, financial data; and photocomposition for printing. In general, any user with high CPU output that must be translated frequently into multiple copy runs should consider COM, most observers agree.

The entry-level cost of a COM system is now about \$30,000, according to *Micrographics Weekly* editor, Loene Trubkin. The publication estimates about 250 new COM systems are being installed yearly with a total price tag of more than \$15 million.

About 390 COM systems were installed in 1971, based on the marketing estimates of the International Data Corp. And there is currently a total of about 700 COM sites in operation, according to *Micrographics Weekly*. This number of installed systems is still very small when compared with IDC's estimated 39,000 general-purpose DP users in the U.S.

"Anyone that has a lot of data to manipulate and has to retrieve his records often is a prime candidate for a COM system," states Jim Pyle of Calcomp. "Banks, insurance companies and any of the technical industries can utilize the microfilm systems," he adds.

COM must do a better printing job than printers at a low cost, Pyle says. Early COM systems handled drawings as well as alphanumeric "printing," but now systems that are "printer only" types without the graphic capability are required by users, he says.

Most COM systems generate characters via a CRT onto a screen. And the image is

then photographed. The quality of the image generated by the CRT has been lacking in early COM systems, Pyle says. "But users are beginning to see the kind of quality that the COM vendors promised them three years ago," he adds.

"We've had a COM system since the first of this year," one user said. "And while it holds great promise in the retention of archival records, you need a very, very controlled and disciplined environment to operate effectively."

"There are still a lot of environmental problems like dust getting on the film," the user noted. "When you blow up a dust speck 42 times it really scars the microfiche."

"The extra speed is definitely there with the COM system but when you have to

### Buyer Guide Available

Users evaluating the potential of Computer Output Microfilm for in-house or service bureau applications can benefit from a COM Buyer Guide published by the National Microfilm Association. The guide lists suppliers by type of equipment and also includes vendors of COM services and accessories. The guide is available free from the NMA, 8728 Colesville Road, Silver Spring, Md. 20910.

cycle your output tape a second time to do titling and indexing then you have an extra operation," the vice-president of the installation said.

"You don't put a COM system in like a popcorn machine. It requires special personnel and special handling," one user said. "Above all, it is not a normal DP operation," he added.

"It is worth the investment and has great potential in the replacing of hard copy. It is faster and uses far less space for storage, but you don't just 'slide it into your installation.'"

"Anyway you look at it, COM is still a printer replacement," according to George Smith, COM sales manager at Memorex. "Rather than getting a stack of paper, the user is getting a piece of film. But it is basically the same documentation," he says.

Memorex estimates that 60% of new COM shipments operate on-line to relieve output-bound DP users. "Most of our new customers have a 360/30 or 40,"

(Continued on Page 9)



## Veteran Sees System as 'Magic Box'

Many of the current COM users are relative newcomers to the technology, but at least one firm, Products of Information Technology (PIT), is a COM veteran.

PIT, a specialized user of microfilm, utilizes the medium as an intermediate step between computer output tape and

### Users Slowly Erase COM Printer Image

(Continued from Page 8)

Smith adds, "And typically he is in finance or manufacturing."

These output-bound users have to "relieve their printer load or get a new larger computer," Smith says. And a COM system can forestall the purchase of a new CPU for this type of user, he believes.

But some see the use of a COM system on-line as a waste of valuable CPU time. The user can also more profitably exploit the full capability of COM when it is used off-line, according to these authorities. "We think the off-line COM system is a lot better for the user and the EDP operation. It makes a lot of sense to keep the COM off the mainframe," according to Rod Mead, product manager for COM at Pertec Corp. "We think the biggest growth will be in off-line COM for those that can provide the user with a total system and on-going support," Mead says.

Some COM authorities see the on-line, off-line choice as depending on the application and type of film. "Roll film can be on-line or off-line depending on volume. But with extensive editing and retrieval it should be off-line. And microfiche really has to be off-line," according to Charles Askanas, president of Quantor Corp.

#### Prefer Off-Line

"The more software that the user needs, the more he would prefer to be off-line. With extensive software a user is taking more partitions on the CPU. And very few customers are willing to make this many changes in their operating systems," says Askanas.

Smaller users are going to COM because in some ways they are more aggressive than larger corporations. "Smaller users make faster decisions with less red tape," he adds. Smaller banks and companies usually have a person who understands a concept like COM. And where cost is significant the user can get very quick decisions in this type of environment, according to Askanas.

The cost justification for COM should not be based on a comparison with printers, Askanas feels; instead, COM should be evaluated against another "active information medium" like terminals.

"Getting a COM system installed is usually cheaper than evaluating a complete terminal system," he maintains.

Many terminal users have been oversold, Askanas thinks. Most terminal systems that don't have to operate on-line can be replaced by COM with a savings of up to 90% in many cases, Askanas says.

At least one micrographics consultant, Alonzo J. Sherman, sees a big breakthrough in COM installations tied to a lower price. "There is a price breakthrough coming. COM systems used to be \$50,000 to \$70,000 and now they are at \$30,000 with \$20,000 as the next level," he says.

To fully utilize the capabilities of a COM system, the user "must go back to the source program and actually put some new commands and recompile," according to Ed Snyder, director of information technology marketing at Kodak. Normally the user will have a software module that the recompiled program "will react with," Snyder says. "And this software will insert the proper titling information so that the output is formatted for a COM instead of a line printer."

good quality hard (paper) copies. The firm operates a "computerized publication" service that provides final paper reports and bound volumes to customers.

"We have used sophisticated plotting systems made by Stromberg Datagraphix like the 4020 and 4060. And we have had an FR-80 from Information International," says Dr. Harold Jasper, the firm's president. PIT is currently using a Singer MS-6000 with a Datacraft CPU that operates with proprietary in-house software.

A recent addition to the user's COM arsenal may well be the first of a new generation of microfilm systems. The company recently installed a Quantor 105 COM system that has impressed Jasper.

#### A 'Magic Box'

"This is the first 'commercial-type COM' that we have installed and it is truly almost a 'magic box.' All our previous COM systems have required utmost

sensitivity and extremely high technical support; had a large amount of downtime; and a general lack of reliability," Jasper says. "But this Quantor system was running within two hours from the time it was taken off the truck," he adds.

"The background density and the base density of the characters" are better than Jasper has seen on most other systems including his in-house Singer COM. But the Singer system will continue to be used for roll film while the Quantor COM will be used for fiche.

Does Jasper think automated COM systems like his Quantor unit will give the medium a much-needed shot in the arm? "I think the problems with COM are more than technical. I think they are also economic," he says.

"There are some applications that are very appropriate for microfilm and others that are very foolish," Jasper states. It is up to the user to properly utilize a COM system, he thinks.



The Quantor 100 on-line COM system records and develops microfilm in one automated operation. It is priced at about \$30,000.

Among the more sophisticated editing functions that PIT performs with its specially programmed Singer COM are control over the "aspect ratio of a character that can change the relationship of height to width; and control over inter-letter or inter-line spacing," according to Jasper. These functions are accomplished via a special software run on the Datacraft CPU which controls the Singer system.

# "COMPUTER PRINTOUT WAS COSTING US A FORTUNE."

(G. E. Richards, Manager, Data Center, The Goodyear Tire & Rubber Company)



### Kodak COM system saved Goodyear \$250,000 on forms alone.

At The Goodyear Tire & Rubber Company's data processing center in Akron, Ohio, nine computers turn out vast quantities of data for their worldwide operations.

To help distribute and utilize this data faster, Goodyear installed a Kodak KOM-90 microfilmer, which converts computer tape data directly to microfilm... at incredible speed. This eliminated the need for 132 printed forms—enough to pay for the company's entire microfilm system.

And Goodyear also reports substantial savings in file space and improvements in file integrity and information retrieval.

How much can a Kodak COM system save you? Fill in the coupon and we'll help you find out.

Please send me full details on Kodak KOM microfilers and their applications.

Name \_\_\_\_\_ Position \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Eastman Kodak Company  
Business Systems Markets Division  
Department DP539, Rochester, N.Y. 14650



For better information management

**Kodak Microfilm Systems**

## Editorial

### System Certification

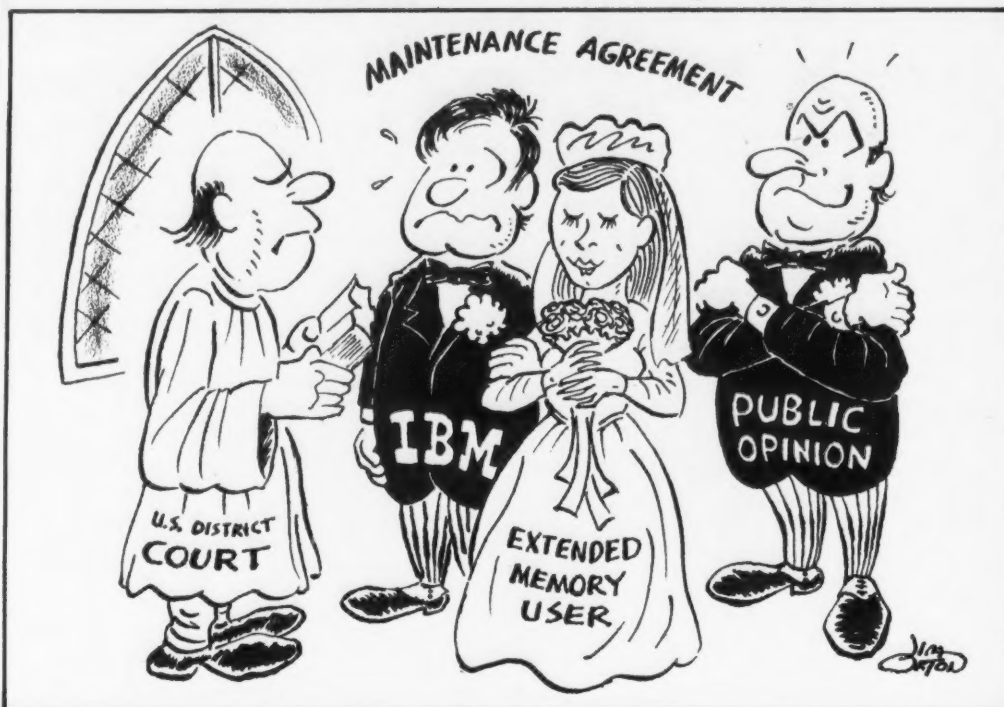
The American Federation of Information Processing Societies (Afips) has launched a system certification program to protect the public against poorly designed or implemented systems. The goal is to develop system standards that will spell out how a system should function.

Meanwhile, the Society of Certified Data Processors (SCDP) is approaching the problem from the opposite side. The SCDP's Committee on Unprofessional Practices is compiling a list of things a system should not do.

With Afips bearing down from the top and the SCDP pushing up from the bottom, bad practices should be eliminated more quickly.

Both of these complementary efforts should be encouraged and assisted.

## The Reluctant Bridegroom



## Letters to the Editor

### 'Trademarks Don't Protect Substance of Program'

Regarding an article in the March 8 issue by Joseph Hanlon dealing with legal protection for computer software, I must take issue with Dr. Bryan Niblett, who is quoted as placing great reliance upon a trademark in the protection of computer programs.

A trademark is a word, name, symbol or device used by a person to identify his goods or services and to distinguish them from others. As such, it simply protects the name given to the particular program. It does not go so far as to protect the underlying program.

A competitor who comes upon a program not covered by patent or copyright, or not subject to the confidential status of a trade secret, could copy it with impunity provided he changes the mark or name which identifies it. And, at least in the U.S., he probably could advertise it as precisely the same program as that being offered under the competing trademark.

I fully agree that keeping the program secret is by far the best form of protection. Trademarks, however, while important in their own right, are only incidental and do not protect the substance of the program.

David Goldberg  
Kaye, Scholer, Fierman, Hays & Handler  
New York, N.Y.

### Reader Offers BAL Program

In the March 15 issue is an article describing a Fortran source language cleanup program. I wrote a program two years ago in Fortran/BAL that performs the same functions. I would be glad to supply anyone interested with documentation and a source listing or a 360 object deck of this program for the price of the postage.

This program has been used extensively and is guaranteed to resequence statement numbers appearing in any IBM Fortran statement.

James Amick  
Research Programmer

Hallmark Cards  
Kansas City, Mo.

### If Management Learns...

I cannot imagine your source of information for the News Wrapup story [CW, March 22] unless you get the Delaware State News.

Like the State News, your article para-

phrases my quotation of the old cliché that computers don't make mistakes, people do! Unlike the State News, your article contains many mistakes, but your source did not have the benefit of more than three hours visiting with me at the data center as the State News reporter did (after which he still got the name wrong).

Your article starts with an erroneous headline. The pay date was not wrong — the change of one day was directed by the authorities, thus carrying the date into a new month (March). The computer program recognized the month in the pay date and computed pensions based on the third month of the year rather than the

period covered, which was the second month, thus the error.

The date change was directed on very short notice, not because of a new law but because of an attorney general ruling on a very old law (July 18, 1955).

We are not the least bit happy about this kind of publicity; but if management can learn from it, it may not go down as a totally wasted effort. Last minute changes in any complex program, no matter how simple they appear, without manpower resources or time for full research and test, are inherently deadly; and DP personnel invariably take all the blame.

If you refuse to make the directed

change, you're wrong. If you delay the run (payroll?) for research and test, you're wrong. If you make the change and it blows, you're wrong. And if, by chance, the change has no hidden effects and the run goes smoothly, management says: "See, we told you it was easy! Why do you data processors always make such a big thing of it?"

For the State of Delaware, the next one will be made over my resignation!

Arthur T. Hill  
Director of Central DP

State of Delaware  
Department of Administrative Services  
Dover, Del.

## User Lauds IBM's Present Software Strategies

By Michael F. Smith  
Special to Computerworld

It is true that IBM provides "free" systems software to sell its hardware, but I just can't believe it intentionally writes its software to require excessive system resources, as the March 1 viewpoint article suggests.

The carefully made Power versus Grasp comparison excluded several points.

The independents, when adding these enhancements to DOS, have a tremendous advantage over IBM — they have learned from IBM's experiences. They are provided with far better marketing input, since the independents' input represents a user reaction to IBM's solution. For IBM's part, it is hard to get an accurate marketing feel on an innovative product.

At the point IBM provides its software, it is to some extent locked into the original design of the concepts and facilities, regardless of how sound. Radical departures from the original implementation are discouraged because IBM attempts to provide the user with a measure of compatibility — both functionally and operationally.

The independents per se have less regard for this principle. The users of IBM's free software call for constant changes and enhancements. As IBM complies, its software becomes a patchwork of changes and fixes.

The article asks "... why should IBM care if its free software gets replaced by an independent package..." I think that's reasonable and I believe that's IBM's attitude. The market has been flooded by numerous packages, and some are very good, such as Grasp. But many

of these organizations have also filed for bankruptcy in recent years, leaving their customer base high and dry. I'm glad IBM provides all its customers protection from these companies, by supporting its free software regardless of what the competition is like.

It must also be noted that the independents charge for their packages, and so must be superior, at the least, to justify

## Viewpoint

their own cost. The cost analysis of the facilities — throughput versus real cost — must be determined by the user. In many cases, fixed overhead costs cannot be recovered and, hence, cannot be applied to the increased throughput of a non-saturated machine. I am pleased that IBM supports this class of user, and does not abandon it as suggested.

In general, DOS is a small operating system designed for small machines. OS does not support the 370/135; that's a DOS machine.

The IBM user group Guide has submitted many resolutions on DOS development, which have been accepted by IBM — admittedly no guarantee of implementation. I can't believe IBM would do this if DOS were in fact dead. I believe DOS will undergo great changes in the future as a result of some other announcements affecting the System 370.

IBM has been afflicted by numerous petty and some not so petty lawsuits. As

a result of one case, IBM is not allowed to preannounce, a situation which IBM users should not have permitted.

I believe a number of announcements are forthcoming from IBM, and each taken at face value will reveal little. The functional stabilization of DOS/360 is one small part of an overall picture that IBM is not permitted to divulge. This stifles the users' medium- and long-range planning; but it's certainly not IBM's fault.

DOS will be around awhile. IBM must recognize that DOS represents 70% of its applicable customer base. It must also recognize there have been no statements by IBM, implicit or otherwise, which say that DOS is dead.

### OS/360 Stabilized?

I expect to see soon that OS/360 will be stabilized. The development of the older System 360 is over as we move on to the System 370. The System 360 ended the effective development of the 7000/1400 Series. It is both consistent and justified for IBM to end the effective development of the System 360 as a result of the System 370.

The 360 is seven years old. Machines, computer or otherwise, are depreciated over their life span, and that is an accepted approach; but so should software, because that's the real world.

To paraphrase a paraphrase — "As an IBM user, I applaud its strategies, past and present. As I look around, I see the best is yet to come."

Smith is a DP consultant for Data Dimensions, Inc. of New York and Greenwich, Conn.



## 2 Independent But Associated Societies Seen by Readers as Possible Answer

The recent column [CW, March 15] about whether or not the Society of Certified Data Processors was the wrong new society formed last year has elicited some distinct differences of opinion.

Many CDPers and CDP candidates felt the SCDP was sufficient, although they felt it might admit more people or more categories (the current restriction to CDPers was the result of a previous vote last year). This opinion seemed to hold generally whether or not the CDPer was a member of the SCDP or not.

On the other hand, most non-CDPers felt the current society was not adequate, and that there was a need for a different society with different membership characteristics.

### The Taylor Report By

Alan Taylor, CDP



Particularly interesting was the constant reference to DP management in the non-CDP responses. Many of the respondents themselves were involved in management — as director of MIS; DP manager; district EDP manager; manager, systems & computer services; manager, operations and technical development.

It appeared that many people in these positions felt they had both a particular reason to want to be professional — and a perfectly valid reason for not necessarily holding the CDP. As one respondent said, a manager does not have to be an expert mathematician.

While the responses indicated many people were interested in an associated membership of some sort with SCDP, problems in this area were apparent as the voting opposed allowing certain groups of people — such as hardware vendors — into the new professional society.

The SCDP is not in a position to keep out anyone who holds the CDP, and many holders are

employed by hardware vendors and other suppliers.

Since it hardly seems practical for a subsidiary membership to bar members of the main society — which is what would be needed to follow the wishes of the respondents — associate membership of the SCDP seems out of the question.

But, the wish to include practicing data professionals, particularly when they have some management authority irrespective of any educational characteristics, seems to make associate membership in the other direction equally implausible. So the votes indicate two independent societies which may choose to associate with each other or not as they decide.

At least, that is what they are currently indicating. But there is plenty of time for this feeling to be amplified or reversed. Many people made very concrete points, in addition to answering the questionnaire itself. Following are some replies. Make your professional voice heard by filling in the questionnaire on this page, and sending it to be counted.

## Some Words on Professional Societies

### 'Limit the Society' To CDP, RBP Holders

I believe such an organization should be limited to CDP holders and RBP holders, and any person actively engaged in the data processing field who will declare his intent to obtain one of the certificates within three years, providing such a person provides reasonable proof that he is working toward the declared intent and there is reason to believe he will achieve such status.

John Massing, CDP  
Fort Myers, Fla.

### 'Enough Societies'

There are enough "societies" already. Another professional society would confuse things and cause more overlaps and conflicts. The ACM, DPMA and SCDP all have their place. The other DP societies hopefully fill someone's need but tend to dilute any organized effort toward professionalism.

Why not unite behind the major existing societies and work within them to develop whatever is needed to promote professionalism? New societies eventually need paid employees to run them and I dislike the idea of creating jobs for the unemployed, discontented or malcontents when we can accomplish the same thing through existing organizations.

David E. Primm, CDP, SCDP  
Grand Junction, Colo.

### 'Forum for Activity'

As an individual, I have been looking for an industry-wide association dedicated to defining and maintaining professional standards of excellence in data processing. About a year ago, I joined the Association of Computer Programmers and Analysts

because they were working somewhat in this direction.

Work done since then has convinced me that individual associations dedicated to particular segments of the data processing industry cannot accomplish this task alone. This is due to the interrelated nature of functions — and knowledge required to perform those functions — throughout the industry.

The entity which defines industry-wide standards must be able to relate and keep in perspective all the subfields within the industry. That entity could take the form of a collection of concerned individuals (SCDP's current posture), an association of the various professional societies involved with data processing or a combination of both. The key feature of the entity is that it be a forum for all activity related to data processing.

Professional education and standards enforcement can be handled by societies dedicated to particular fields or subfields, with some assurance that we are all working in the same general direction.

This approach would limit that association to standards development — but maybe that is not a bad idea. The existing societies appear to be primarily concerned with education or social activity, using standards development as a tool to further particular goals in those areas. Industry-wide goals are not necessarily consistent with any society's current goals, so they cannot be unquestioningly depended upon. If any society can perform this function well, the industry would owe it an unrepayable debt.

James R. Manley  
Baltimore, Md.

### Be 'Strong, Active'

I would think that a strong and active SCDP would enhance the

CDP and thus increase its desirability, while opening the society to all (non-CDP) professionals would have the opposite effect of watering it down.

W.P. Davenport, CDP, SCDP  
Alameda, Calif.

### 'SCDP Is Enough'

The SCDP is enough. Creating another club would only be throwing a lot of dust in the air. The CDP could someday be as important as the CPA. Keep the society exclusive. Let the "outsiders" carry on, but make them prove themselves by passing the CDP exam. If you give in on this one point, you will completely destroy the potential stature of the SCDP.

Davis C. Fellers III

### Another NAA?

If you let non-CDPs in, it could become another NAA — mostly a vendor sales organization.

R. David Guthrie, CDP  
Los Angeles, Calif.

### The Right Society

I don't think we have formed the wrong society in organizing the Society of Certified Data Processors. By the way, please consider this letter as an application, on my part, to join the society.

Our friends in the accounting profession have the Society of Certified Public Accountants, and also have several other organizations for non-certificate holders, such as the National Association of Accountants.

I think if we form another society, it should be along the order of the National Association of Accountants, and should include all elements of our profession, such as teachers, practicing data processors and persons in industries serving data processing with a definite interest in the advancement of the profession. I suggest the name National

## Have We Formed Wrong Society?

1. Do you think that the current SCDP, restricted to CDP holders only, is sufficient for professional matters, or should a more general society of professionals be formed?

- ☐ SCDP adequate?  
☐ More general society needed?  
☐ Other (please specify) \_\_\_\_\_

2. Who should be able to join a general professional data processing society, designed to advance professionalism wherever possible?

- ☐ Practicing data processors?  
☐ Teachers of data processing?  
☐ Sellers of data processing?  
☐ Sellers of data processing hardware?  
☐ Other (please specify) \_\_\_\_\_

3. If such a society is formed, do you think that it should be:

- ☐ an associate membership of the SCDP?  
☐ a joint society with the SCDP (perhaps two divisions of one society)?  
☐ an associated but independent society by itself?  
☐ an independent, unassociated society?  
☐ Other (please specify) \_\_\_\_\_

4. What do you think the name of such a society should be?

- ☐ The Society of Certified & Professional Data Processors?  
☐ The Society of Professional Data Processors?  
☐ The Society of Practicing Data Processors?  
☐ Other (please specify) \_\_\_\_\_

5. Should we treat this as an enrollment application for SCDP (\$9/year, but going up)? ☐ Yes ☐ No  
the new society (\$20/year planned)? ☐ Yes ☐ No

Name \_\_\_\_\_ Address \_\_\_\_\_

CDP Holder? ☐ Yes ☐ No SCDP Member? ☐ Yes ☐ No  
Professional Position \_\_\_\_\_

When completed please send to Alan Taylor, The Taylor Reports, c/o Computerworld, 797 Washington Street, Newton, Mass. 02160. Copies are welcome if you do not wish to cut your issue of the paper.

Association of Data Processors for this other association.

I don't think we should confuse the SCDP with this type of an association. The SCDP to me should be a higher level organization, which sets broad principles for the data processing industry to follow, similar to what the Aicpa does for the accounting field.

The National Association of Data Processors can keep non-certificate holding members up

on these types of practices, as well as just plain "good common sense" business procedures to be followed in the data processing environment.

R. W. Zinnecker, CDP  
Wentzville, Mo.

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# Harlem Firm on Rocky Road

By Don Leavitt  
Of the CW Staff

NEW YORK — A lack of understanding on the part of hardware vendors and city agencies is one of the problems faced by a Black-run data entry service set up last year in Harlem with Office of Economic Opportunity (OEO) funding.

Commonwealth Data Services uses both IBM and Univac keypunching and keyverifying equipment. The company had hoped to benefit by having two sources of support, but instead it got two sources of problems, according to Shirley Young, Commonwealth's president.

IBM's custom engineering support has been fine, Miss Young said, but she has a difficult time trying to contact salesmen. When she calls IBM's sales office, she has been told the man she asked for has been transferred, and that no one else is available. "They just don't want to come to this part of the city," Miss Young claimed.

Commonwealth's problems with Univac have been similar to the ones with IBM. The Univac salesman has been very helpful, Miss Young explained, but the service manager once told her he wasn't going to take money from his petty cash to send one of his men to Harlem.

The Univac manager admitted "there was a misunderstanding" with Commonwealth, and added that now he has provided the company with all the service it needs, and probably more than he gives others, just to make up for any past errors.

Equipment maintenance isn't the only problem, Miss Young noted. More frustrating, perhaps, is that government agencies on the state and local levels place major keypunching contracts with "off-shore" data entry operations.

Admitting that such non-U.S. services charge lower rates than

domestic companies, Miss Young stressed the effect the "exporting" of work has on the local keypunching job market. One such contract, she said, would have kept 60 keypunch operators employed for a year.

The money saved by placing work "off-shore" has to be compared with the money paid out as "unemployment" or welfare to the "hundreds of operators" looking for work in New York

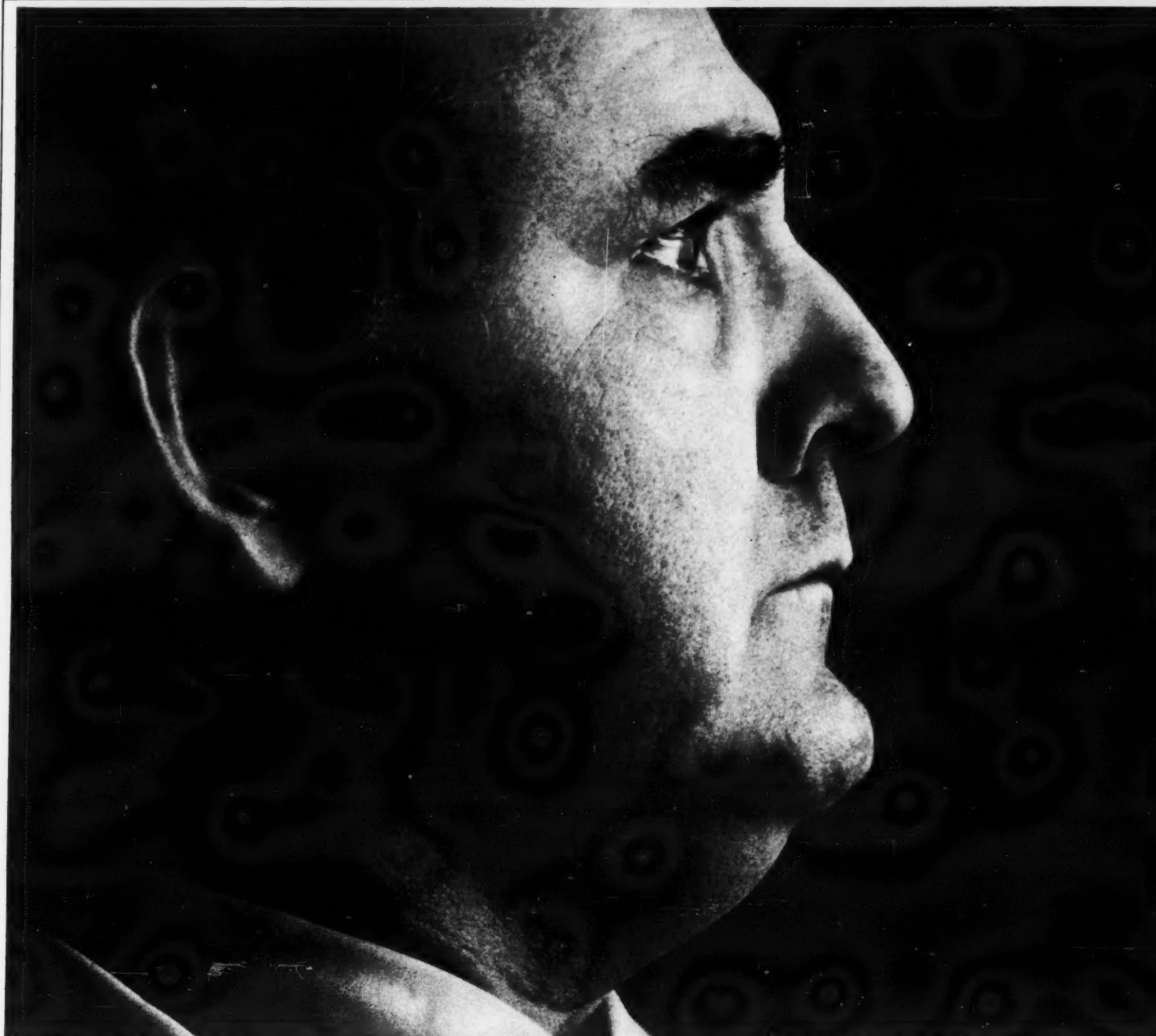
City, Miss Young suggested.

Despite the problems, Miss Young said Commonwealth has about a dozen IBM and Univac machines installed, and employs 33 operators on three shifts. The company has begun to look at keypunch replacement units.

Month by month, Commonwealth is running in the black, "anyway you want to take that phrase," Miss Young added.



Keypunch operators use both IBM and Univac equipment.



## Training Center Comes to Harlem

NEW YORK — A new computer job training center will open in Harlem early this summer and will provide free training, counseling and job placement for careers in data processing, according to Dr. Milton A. Galamison, of Opportunities Industrialization Center of New York (OIC).

The center is sponsored jointly by OIC, IBM and the Sperry & Hutchinson Company (S&H).

Complete training for jobs as computer operators, programmers and keypunch operators will be offered at the center.

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# DP Job Market Looking Better in L.A. ... or Is It?

By Marvin Smalheiser  
CW Correspondent

LOS ANGELES — Programmers and systems analysts looking for jobs here are finding the going a little more encouraging than the past two years, but it still isn't easy.

A survey of firms and employment agencies by *Computerworld* indicates an improvement in the data processing job market.

But in spite of the improvement, many companies are not ready to go full speed until the economy is a little healthier.

The hiring activity now is primarily at the programmer and systems analyst level and firms contacted reported that turnover is practically nil.

## Optimistic Reports?

The most optimistic reports came from employment agencies

specializing in DP, but even they said they didn't expect the job market to return to where it was in 1968-69.

Wayne Emigh, director of Source EDP, said there "most definitely is an improvement" and it looks like it is going to continue to get better.

The major demand, he said, is in the programmer and systems analyst category and salaries are up, but they are not matching

the growth in the job market.

"The number of unemployed and the period of unemployment is significantly less," he said.

Alan Strong, of Career Data Personnel Agency, said financial and insurance companies were in the market and retailing and manufacturing are "just starting to pick up."

Sam Wallace, placement manager for the Robert Half Person-

nel Agency, said the hiring activity is in the \$12,000 to \$13,000 range. "It boils down to the fact that companies now seem to believe this is going to be a lot better year than the previous two," according to James M. Shrode, general manager of Leir Systems Agency, Inc.

The same picture was true at a major regional supermarket chain, where the data processing manager said the job market was "stagnant." Two programmers were hired for a special project, but otherwise there has been no hiring and "very, very little turnover."

The Los Angeles City Data Service Bureau recently hired 69 persons ranging from trainees to senior programmers, but with funds from the Emergency Employment Act of 1971.

At TRW Systems Inc., Redondo Beach, an executive said: "The situation is opening up somewhat. Jobs are not as scarce as they used to be."

Programmers and systems analysts, he said, have been hired but management jobs are not opening up at all.

## Airport Probing Seen Harmless To Mag Tape

PARK RIDGE, Ill. — Detection equipment used at major airports to protect against current bomb extortion threats has no harmful effect on computer magnetic tapes, according to the Data Processing Management Association (DPMA).

The association, in a letter to its membership, said it had investigated a report that computer tapes could be erased or distorted if carried through such equipment recently installed at certain points.

It said it had queried officials with the security section of the Federal Aviation Administration at O'Hare International Airport, the manager of the cargo department of a major airline operating out of O'Hare, two makers of detection devices and a national company manufacturing computer tapes.

In all instances, the responses from these authorities were negative. Detection equipment, it was learned, has a passive influence on magnetic tape. The typical airline terminal device consists of two poles between which passengers and hand-carried luggage pass for inspection. The poles are equipped to determine any interruption in the earth's field of gravity between them, by any object made of ferrous metal.

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By Dave Smith

Special to Computerworld

KEENE, Calif. — After Cesar Chavez and the United Farm Workers Union signed contracts with the grape growers in July of 1970 at the union headquarters in Delano, the increase in union membership was accompanied by a rapid growth in the paperwork necessary to service the membership.

The union had to keep track of the \$3.50 dues paid each month by each member (over 20,000) at any one of 20 field offices. It had to honor claims on the Robert F. Kennedy Health Plan for medical benefits dependent on eligibility based on the number of hours worked. Because the systems used and maintained on a "crisis" basis by volunteers began to fall apart with the increased work load, a computer system seemed to be the solution.

Professor Henry Lucas of Stanford University's Graduate School of Business, along with Professor William Sharpe, Rodney Plimpton, and several

graduate students obtained a grant to undertake a feasibility study and recommend a better system.

The union approved the recommended system but could not afford to have its own computer or even rent much time on someone else's. It was feared that not many trained programmers or keypunch operators would work for the \$5 a week all staff members live on.

With a couple of letters to the editor of *Computerworld* and other publications, the union reached the computer field with an appeal for keypunchers, programmers and equipment. Many letters were received from concerned and interested people, but most of them wanted to program or keypunch in their spare time where they were.

Three programmers, Fred Patch, John MacLaughlin and Edna Buchmann and two keypunch operators, Sandy Cate and Bernard Greening, were able to come to Delano and work at a subsistence wage.

To begin operations, an IBM 403 was donated by Bert Monaghan of Los Angeles.

The system was designed to supply a report (in Spanish and English) to every field office with current information on every member so that no matter where the member came to pay his dues, his needs could be met. Of necessity, the system was designed for a four-tape 360, which gave the widest possible range for finding computer time.

Computer time and assistance was donated by Electronic Tabulating Co., a division of C.W. Sweeney and Co., of San Francisco. The firm not only offered to run the monthly system on its four-tape 360/30 free of charge, but also offered to provide time to develop, convert and implement the system free of charge.

At some time, the value of processing, timeliness and security issues will probably necessitate the acquisition of a small 360 or even a System 3 for the union. Because of the high cost of a machine, it is hoped a donor can be found to help the union.

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## FBI Wants \$950,000 For Fingerprint Study

By E. Drake Lundell Jr.

Of the CW Staff

WASHINGTON, D.C. — The results of research and development work on computerized fingerprint scanning and identification equipment have been "most encouraging," FBI Director J. Edgar Hoover told a Senate committee recently.

Testifying before the Senate Appropriations Committee, Hoover said the FBI wanted \$950,000 for such research this year, up \$500,000 from the amount last year on the program.

The FBI, he said, is currently working on automatic fingerprint scanning equipment which will read and record identifying characteristics from inked fingerprint cards. The FBI is also developing computer programs to classify and match the data read by the scanning equipment, and is making systems studies to plan other automatic systems to replace manual procedures in the Identification Division.

The large 1973 budget request for research in the fingerprint area, Hoover said, will be used to "remedy deficiencies detected during the testing and evaluation of the prototype scanner system and to develop ways of improving its performance for eventual operational use."

The efficiency of the present prototype system will be improved by the development of high-speed card-handling equipment, Hoover said.

In addition, the FBI is planning to "perfect the computer programs that will automatically classify and match fingerprint data generated by the fingerprint scanner," he said.

The FBI was planning to start preliminary design work on a special purpose computer system to perform fingerprint matching operations at high speeds.



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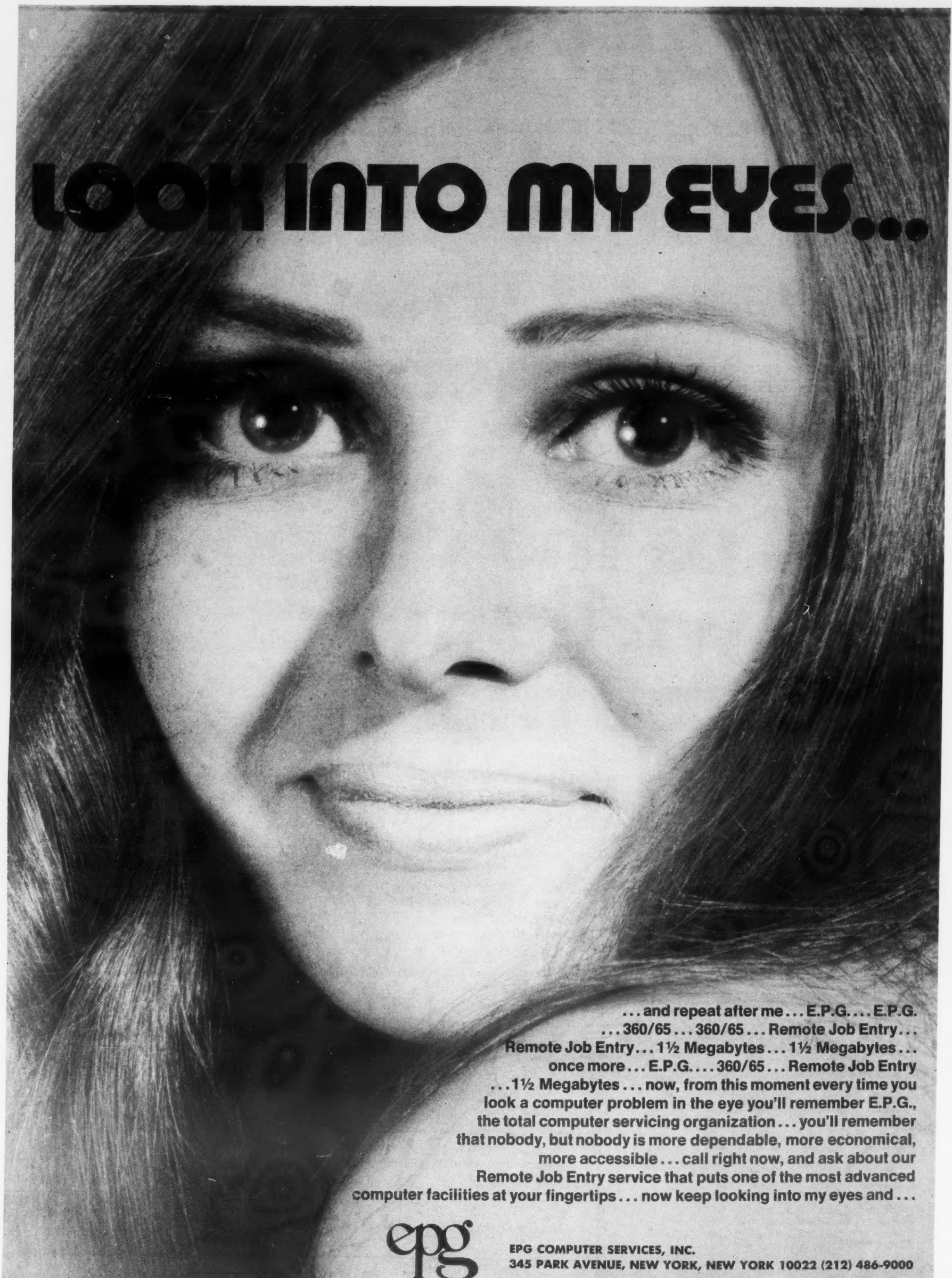
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## Random Notes

Hexco Gauge Uses Colors  
For Easier Card Reading

HOUSTON — Characters punched in an 80-column card can be easily read with the Punch Reader gauge from Hexco Inc., since the aluminum device shows the columns, alternately, in red and black. The gauge also includes charts for the interpretation of punches into hexadecimal, Ebcdic and BCD notation.

Both printing and raised edge guides are accurate to less than  $\pm .010$  in. tolerance, the company said. The gauge costs \$13.50 and can be ordered through P.O. Box 55588, 77055.

Cybernet Adds Center  
At Loyola University

NEW ORLEANS — Loyola University and Control Data Corp. have opened a public terminal facility here offering general scientific and commercial DP to customers throughout Southern Louisiana.

Loyola's New Orleans Public Terminal Center, at 6363 St. Charles Avenue, in the New Science Complex, is the latest link in CDC's nationwide Cybernet computer network, which provides access to 12 super-scale CDC 6000 Series computers.

## "Bug" Gets Indexed Sequential

BUFFALO, N.Y. — Computer Task Group, Inc. has enhanced its Basic Update Generator (BUG) with a series of programs allowing the generator to produce programs to access random files.

The access method will be indexed sequential letting the user insert Cobol statements to change the access mode of the generated Cobol program from sequential access.

The company is at 5586 Main St., 14221.

## Bank Loan Data System Shown

CHERRY HILL, N.J. — The Bankers Commercial Loan Information System, from the ASK Systems Division of Arthur S. Krantzley and Co., Inc., has on- or off-line processing options for multibank and multi-branch environments.

Developed by the First and Merchants National Bank, the system includes on-line posting to facilitate balancing, eliminate time lags and reduces errors, ASK said.

The ASK Systems Division is at 1010 South Kings Highway, 08034.

## Joint Development

## Century CPUs Linked to UCC Network

By Don Leavitt  
Of the CW Staff

DALLAS — NCR Century CPUs, designed primarily as business-oriented DP systems, can perform highly scientific work through telephone ties to Univac 1108s on the University Computing Co. network, under the newly available NCR/UCC Extended Service capability.

The service was developed jointly by NCR and UCC and should provide the Century user with two facilities not available previously on his equipment. In the first instance, the link-up provides the Century user with DP system on a larger scale than he has had in-house.

## Accessibility

The second advantage of the Extended Service, according to both firms, lies in the accessibility to the Century user of the scientific, engineering and technical problem-solving software supported by UCC.

Access to the UCC equipment is handled by a UCC software interface developed under contract to NCR. The software is provided at no cost to Century users, and resides in their equipment.

Users can choose between two modes of operation in interfacing with UCC centers. With 1 16K memory system, card

input is transmitted directly to the network and output is received directly by the printer. With a 32K memory, input can be placed on a disk and transmitted and the output can be received on the disk for later printing.

Minimum hardware requirements beyond the 16K memory include card reader, line printer, I/O writer with

adapter, communications multiplexer, binary synchronous communications adapter, Bell data set, and for Century 50 and Century 100 computers, an I/O writer selector switch assembly.

Extended Service is available under normal UCC pricing, in which the user is charged only for the time and system resources used.

'Abacus' Generates Use Billing  
From Statistics Supplied by OS

ARLINGTON, Va. — OS/360 users operating under MFT or MVT, and with or without Hasp, can bill use of the CPU and peripherals accurately, by job or job step, with the Abacus package from Applied Data Research (ADR). The software also prepares reports for the DP manager.

Although based on the OS-supplied System Measurement Function (SMF) data, the billing module of Abacus provides a crediting capability, through card entries, to offset non-billable work.

## User Customized

The package is customized by ADR for each user. This can usually be done by telephone, the company said, and would

generally entail choosing which reports are wanted, and fine-tuning the formats to user needs.

The billing reports can be summaries of activity for several customers whose jobs are being handled concurrently in multiprogramming mode, or simple accounting records for users who have purchased block time on the 360/370.

Billing records for individual, multiprogrammed customers or user departments are generated on two levels of detail. One summarizes all charges for each job, while the other details the job steps that made up the summarized figures.

The reports for the installation manager are also provided in two ways. The account or customer number format shows who uses what parts of the system in general. The Sequential Time report shows when the system is being used and by whom. The two reports complement each other, ADR said, and should enable the manager to balance the load on his equipment and the needs of the users.

Although the collection of data is done by SMF without any additional core, the reporting may require as much as 150K bytes of memory.

Abacus is available for \$2,500 through ADR's local office at 2425 Wilson Blvd., 22201.

## Package Spools DOS Partitions

STAMFORD, Conn. — The first module of an advanced I/O handling system for DOS/360, which ultimately will support audio response and visual display units, the Auto-Spool package is available from Aids Computer Services Inc.

The package, like most spoolers, captures on disk the printer and punch output but, unlike other packages, Auto-Spool can support all three DOS partitions at once.

## Program Continuation

By providing an intermediate storage area for the low-speed output, Auto-Spool allows the user's application program to continue without delay. Meanwhile, the printer or punch can be fed a steady stream of data so that these units will also perform at nearly their rated speeds, Aids explained.

Typical timings indicate savings of better than 33% in throughput time with an average job mix, the company claimed.

The package is installed within the DOS supervisor and is completely transparent to the user. Control of spooling is provided by normal JCL entries, and no

changes are required in the user's own programming.

The data capture portion of Auto-Spool takes from 672 to 1,088 bytes with a multiprogramming DOS, depending on how many partitions are to be supported. The output program can be run in any partition and includes a set of commands for selective retrieval of spooled data.

The package costs \$3,250, through P.O. Box 1024, 06904.

## Company Preps Text in 4 Days

NEW YORK — The data entry capabilities of the Jamaican Associates offshore facility in Jamaica now include a text preparation unit, geared specifically to the needs of the computer composition industry.

Personnel in Jamaica have been trained in all phases of coding, proofreading and keying on both IBM 029 keypunch and IBM MTST typewriter cassette units, a spokesman said. Card output can be converted to magnetic tape on either IBM 360 or NCR Century 100 CPUs.

Jamaican arranges to pick up user

materials and to return the completed work to the user. Processing time, depending on user location, quality of source documents and quantities, can be as short as four days, the company said.

The Jamaican facility, in Kingston, employs about 130 operators. The company has sales offices at 224 West 57th St., 10019, and has been in operation for about six years.

It expects shortly to open a second U.S. office in Miami, noting Jamaica is only 70 minutes by commercial airline from the Florida city.

## "I almost bought the wrong Job Accounting System..."

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A few weeks ago, Value Computing announced, in *Computerworld*, the availability of Comput-A-Charge, an automatic system for billing IBM DOS/OS computer users which solves the multi-programming billing problem.

The response has been extremely enthusiastic. From one of the first customers:

"I almost bought the wrong job accounting system. In my attempt to save my company time and money, I was about to choose an over-priced inadequate system. Comput-A-Charge stopped me from going down a blind alley. With Comput-A-Charge, I can go into other systems, like scheduling and tape control."



# The single way to store 100,000,000 bytes. The 7330 Disk Drive from **ITEL**.

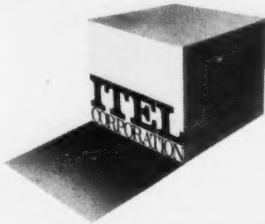
Now there's a single-spindle storage subsystem for massive data bases up to 100 million bytes: the new ITEL 7330 Disk Drive. Using standard IBM 3336 disk packs, the ITEL 7330 increases storage capacity more than three times over previous models to 800 million bytes for an 8-drive subsystem. It's plug-to-plug compatible with IBM System/370. And it's quick on the draw; average access time is just 27 milliseconds.

The ITEL 7330 provides the high-capacity storage needed for management information systems, teleprocessing, multiprocessing and time-sharing systems. It offers a number of advantages over its IBM counterpart and other disk storage units. Each 7330 has a single spindle, so you can specify from 1 to 8 drives under one controller for maximum flexibility. The unit has a waist-high slide-back cover, for quick and easy disk change. All internal components are easily accessible. And its

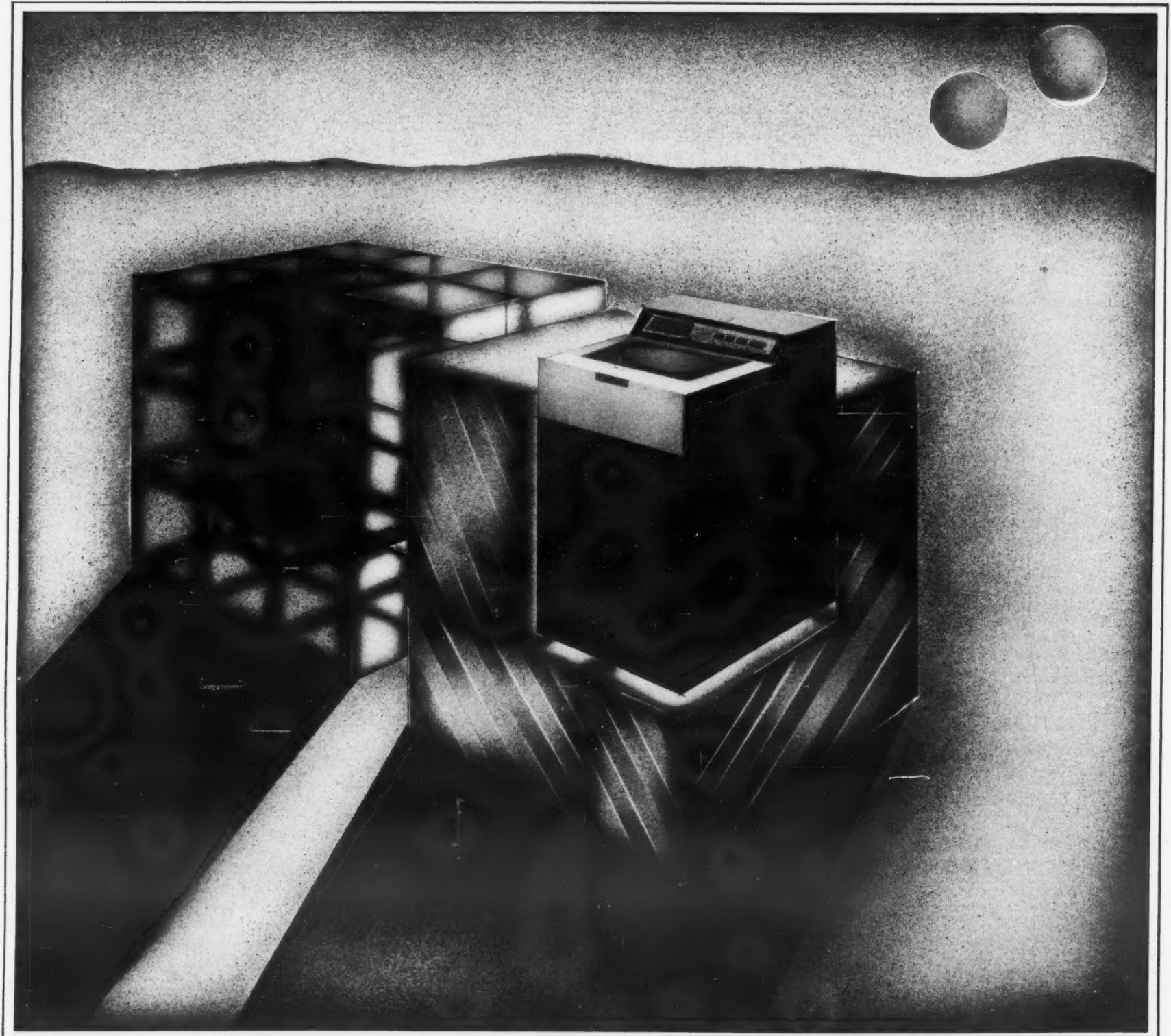
compact size means substantial savings in floor space. Reliability is insured through absolute air filtration, disk pack brushes, electromagnetic actuators and closed-loop optical servo positioning.

The ITEL 7330 is the latest in a line of advanced disk storage drives from the Information Storage Systems Division of ITEL. More than 3000 ISS disk drives are working today, proving themselves to be the industry standard for reliability.

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## Bits & Pieces

### Tape Cleaner Can Handle Punched and Mag Tape

TARZANA, Calif. — A tape cleaner redesigned to clean punched mylar and paper tape is available from Data Devices, Inc., a subsidiary of Data Products Corp.

The Mark IIIA Tape Cleaner costs \$1,800 and can be delivered one month after receipt of order.

Mark IIIA is the only cleaner that can safely clean both mylar and paper tape and it also can clean magnetic tape, according to the company.

This capability is provided by Mark IIIA's patented cylindrical blade in conjunction with design modifications, the company explained. It prevents tape damage in removing punched material that ordinarily would cause severe cutting of the tape when processed by a stationery cleaning blade or block, the company said from 18360 Topham St., 91356.

### Meta/4 Adds Two Card Readers

SAN DIEGO — Two new products, the Model 3463 600-card/min card reader and the Model 3465 1,000 card/min card reader, have been announced by Digital Scientific Corp. for use with DSC's Meta 4/1130 and Meta 4/1800 computer systems. The readers are supported by DSC's emulation firmware and IBM's DM-2, TSX and MPX software.

Pricing is \$5,950 for the Model 3463 and \$7,950 for the Model 3465. Delivery starts in March from 11455 Sorrento Valley Road, 92121.

### Unit Adapts Printer to Minis

MINNEAPOLIS, Minn. — An interface controller from Mini-Systems, Inc. to drive the 100 char./sec. Printec-100 line printer, the Series 160 Interface, is designed for Data General and Digital Computer Controls systems. Interface price in single quantities is \$575, including supporting software.

The Series 160 controller is available from Printec manufacturer's representatives, or from Mini-Systems, Inc., with a delivery of 30 days. Quotes may be obtained from Mini-Systems for interfacing the \$2,200 Printec-100 with other minicomputers, from 4935 Boone Avenue North, 55428.

### Rewinder Handles Four Cassettes

NORTH READING, Mass. — A four-station cassette rewinder from Acutor, Inc. is designed to assist users of Philips-type cassettes by eliminating the necessity of production equipment for the rewind function. It can rewind four cassettes simultaneously and a clutch drive protects against tape breakage or stretching. Cassettes can be loaded or unloaded while the rewinder is operating. Offered in either 110V or 220V configurations, the rewinder sells for under \$100 from P.O. Box 311, 01864.

### Mylar Tape Halts Metal Abrasion

PHILADELPHIA — Paper Manufacturers Co., has a new type of laminated perforator tape. Mylar/Opaque/Mylar (MOM) is a combination of two plies of polyester film joined by an opaque adhesive.

MOM, the company explained, ends metal abrasion on punch pins by eliminating the metal foil that caused it.

## Coded by User

# HP Adds Programmable Microstorage

By Frank Piasta  
Of the CW Staff

CUPERTINO, Calif. — The addition of the dynamically writable control store and programmable read-only-memory (PROM) writer as options to the Hewlett-Packard HP 2100 minicomputer series lets the user code and debug his own microcoded subroutines, according

to Fred Coury, small computer development manager.

Not only do the options facilitate the implementation of hardwired subroutines that can improve performance by a factor of 15 or 20 compared to software, but they also let the user completely reconfigure his machine, even providing it with a new instruction set, Coury said.

This ability to dynamically alter the microprogramming is exclusive to the 2100 Series, Coury said. It allows microprograms to be debugged on-line before being permanently placed in the ROM, he said. The option includes a 1K 24-bit word ROM; 2116 emulation takes 256 words as does the floating point routine.

Microassembler drivers, editors and diagnostic routines will be available this month.

### 3000 Software

The first demonstrations of the HP Multiprogramming Operating System software for the HP 3000 Series will also take place this month, according to Bert Forbes, HP computer systems development manager.

Smaller in capability, the HP 3000 is also significantly lower in cost than the DECsystem 10 and the Xerox Sigma 5.

Languages provided include Basic and Fortran as well as SPL, the Algol-like machine language of the system. Plans are for additional languages, such as APL or Algol and possibly Cobol. A report generator, however, will probably not be implemented, Forbes said.

## IBM Turnkey System Provides Property, Document Protection

WHITE PLAINS, N.Y. — An IBM computer-based turnkey system promises greater protection for people, property and documents.

The Controlled Access system connects magnetic stripe card readers to an IBM System 7 to limit entry according to individual ID card number, door location and time of day.

Any controls can be changed or new cards validated by keying new instructions into the CPU. A visitor's card valid for one week during working hours and only at specified entrances and areas could be issued, for example.

For maximum security areas, added protection can be provided by requiring additional authorization by a witness. A person entering such an area would need to be accompanied by another person, with both cards coded for dual use in that area.

In cases of attempted unauthorized entrance, the system can be programmed to notify security forces.

One restriction on the system is that the IBM 5029 magnetic stripe card reader must be in places protected from extremes of temperature and humidity.

As many as 64 card readers can be attached to a single system. Readers can be located up to one and a half miles from the computer.

In a typical 16-door system, the monthly charge will be \$1,460 for the System 7, application program and main-

tenance for the operator's console, which is available for a purchase-only price of \$2,240.

The readers, which also must be purchased, cost \$275 each. A programming implementation, including program customizing, and on-site demonstration and training, costs \$1,300. IBM will also contract to manage the installation.

In addition, magnetically coded cards at about \$1 each and standard telephone cable to connect the components are required.

First deliveries will take place in the third quarter of 1972.

## Univac 1106 Gets Add-Ons

STAMFORD, Conn. — Univac 1106 and 1106-II users considering the recently announced Univac multimodular memories [CW, Jan. 26] to achieve memory access overlap, may get similar performance at lower cost with compatible units from Computer Investors Group, Inc. (CIG).

Manufactured by Data Recall, the memories will be priced from 20% to 30% less than the Univac units, according to CIG.

### Free Upgrade

Univac 1106 users who wish to upgrade their CPUs to the faster 1106-II can retain their Data Recall memories, CIG

said. The memories will be upgraded to 1106-II specifications in the field at no charge by Data Recall, CIG promised.

Data Recall memories are already available for the Univac 1108 and 494 computer systems. More than 20 units have been installed or are on order, the company reported.

The Data Recall memories are completely compatible with existing Univac hardware and software, CIG said.

Prices for the Data Recall 1106 and 1106-II memories will be about \$800 to \$1,500/mo less than Univac prices for a 65K word unit. Deliveries are scheduled to begin in June 1972.

## Inforex Key-Entry Systems Can Talk to IBM Computers

BURLINGTON, Mass. — The Inforex On-line Communications feature permits users of its Intelligent Key Entry System to send and receive tapes directly to and from IBM computers via the IBM 2701 or 2703 Data Transmission Control Units or via the Bisync Adapter for 360/20 users.

Similar to the IBM 2780 Data Transmission Terminal in communications operations, the communications feature uses Inforex capabilities that depart from the standard 2780 concept to enhance system performance and communications operations, the company said.

Tape communications with the host computer are accomplished in the background with no interruption to normal data entry activities. The Inforex system assumes a passive role, permitting the host computer to send or receive data whenever the Inforex supervisor places the system in a "ready" or "available" mode.

### 300 to 9,600 Baud

The On-Line Communications feature allows the Inforex control unit to send or receive tapes at various rates from 300 to 9,600 baud, depending upon the modems used and configuration of the 2701 or 2703. Data is transmitted serially in synchronous, half-duplex mode. Two-wire (voice band) or four-wire (full duplex) common carrier facilities may be used.

The system may be unattended and data transmitted across the communications link under specified conditions.

Cost of the On-Line Communications feature is \$100/mo rental per system including maintenance, or \$2,800 for outright purchase. First deliveries are scheduled for August, from 21 North Ave., 01803.

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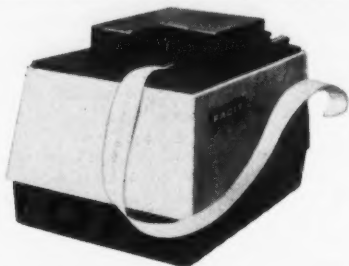


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# Users Rate System 3s High, But Want More Competition in Peripherals Area

By E. Drake Lundell Jr.  
Of the CW Staff

The IBM System 3 is getting high marks from users around the country, according to two recent surveys.

Over 90% of the users contacted said they were happy with their System 3 equipment in a recent *Computerworld* survey and 90% rated their System 3s as "superior" to any other data processing equipment or service used in a poll by the National Association of System 3 Users (Nasu).

The CW survey, however, indicates that S/3 users, while pleased with the equipment, find the prices high and would like to see more competition in the areas of peripheral equipment and independent software.

While only approximately 15% of the System 3 users were presently using independently produced peripherals, another 10% indicated they were seriously considering them.

And 60% of the users contacted indicated they would like to see more competition in this area, particularly in the area of readers, sorters, printers and disk systems.

Only 5% of the S/3 users currently dealt with independent software houses and most of the users indicated they wrote all of their application programs in-house.

At the same time, almost 50%

said they would like to see software packages written specifically for the S/3 users, both more packages from IBM and more from the independents.

About 55% of the users surveyed by CW said they were satisfied with the IBM prices for equipment, but 45% indicated dissatisfaction.

"Their prices are high, but I guess they can get away with it," was one comment.

The more experienced users seemed less happy with IBM

took everything straight from IBM and didn't even realize that other firms offered products for the S/3 market.

### Nasu Study

The Nasu study of 100 randomly picked System 3/10 users found that in addition to the 90% finding the system superior to any other used, 9% found it just as good as any other and only 1% rated it worse than any other service or equipment used.

Nasu, an independent organization of S/3 users, also found that S/3/10 users are turning away from card-oriented system to disk-oriented systems.

Of those surveyed, 54% were card systems and 46% were disk systems, but in a similar study eight months earlier it was found that 75% were card systems and only 25% disk systems.

This figure shows that a large number of the card systems had upgraded in the time between the studies, according to Nasu.

Disk systems also received the heaviest use, Nasu said. These systems were in use an average of 108 hr/mo, while the card systems were used only an average of 87 hr/mo.

The budgets for the disk-

oriented systems were also significantly higher than those for card systems, averaging \$60,000/yr as opposed to \$48,900/yr, according to the study.

Of this, the budgets in the disk installations broke down to \$28,000 for salaries, \$27,000 for hardware and \$5,000 for other expenses. Salaries in card installations averaged \$25,300/yr, hardware rental \$18,500 and other expenses \$5,100.

There were an average of two data recorders per installation, with 1.5 in an average card-oriented installation and an average of 2.5 in a disk system.

The study also found 58% of the disk systems had upgraded from their original installations, while only 48% of the card installations had upgraded.

Overall, 55% of the installations rated the IBM-supplied maintenance as "excellent," 33% rated it "good," and 12% as "fair."

## The Small Systems User

than the first-time users, according to the survey.

Several who had "downgraded" their installations from 360/20 computers to the S/3 praised the hardware, but were critical of IBM service and software for the system.

"I know most S/3 users are happy," one said, "but when they get some more experience with computers and learn what they can demand or expect, they won't be quite so favorable."

At the other end of the scale, a first-time user indicated that he took everything straight from IBM because "I'm too ignorant" to evaluate other equipment or services.

Another first-time user said he

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## Cassette Device Attaches to 2741

LIVERMORE, Calif. — Livermore Data Systems, Inc. has introduced a cassette terminal for the IBM 2741 and compatible terminals. The Datastore 41 interfaces between the 2741 and the user's data set.

The terminal can be used for such off-line operations as letter writing as well as on-line to a computer or terminals. The device emulates the 2741 controls and operates interactively while allowing the 2741 to print both the transmitted data and replies received. More than 200K characters can be stored on a 300-foot cassette.

The Datastore 41 carries a purchase price of less than \$2,000. Lease prices begin at \$44/mo. The Datastore 41 is available on a 60-day delivery schedule from 2050 Research Drive., 94550.

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**For Non-Bell Devices****Some Users Buying Independent DAAs**

By Ronald A. Frank  
Of the CW Staff

NEW YORK — While regulatory commissions are wrestling with the need for data access arrangements (DAAs) some innovative users are buying their own units.

Officially, Bell DAAs are available only on a rental basis from AT&T operating companies, but

**Communications**

a small group of suppliers is selling the devices. "Most of our sales are to independent phone companies but we will sell to users," a spokesman for one supplier said.

The DAAs used by the Bell System are supplied by Western Electric, but the independent phone companies get their equipment from other sources. Among the firms supplying DAAs are Elgin Electronics, Pulse Communications Inc. and Precision

Components Inc. While these independent DAA vendors hesitate to give numbers, one spokesman said "probably 95% of the data users" are thinking about buying their own DAAs.

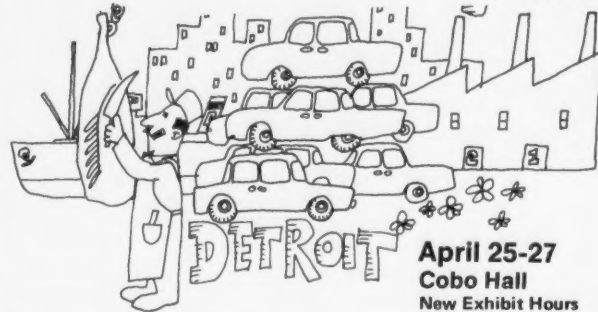
Current Bell tariffs on the interconnection of non-carrier data sets specify that only telephone company couplers may be installed on AT&T lines. But interconnection customers served by independent telephone companies usually are supplied with non-Bell DAA equivalents.

The FCC could rule that DAAs should be built in as part of available data sets and other equipment. If this happens, the independent DAA suppliers see few problems. "Most of our DAA models are wired on one circuit board which could easily be mounted into a card slot in other devices," one vendor said.

Most of the independent DAAs range from \$85 to \$200 depending on model. Some of the vendors also supply a DAA designed to operate on private lines. A Bell proposal to require private line DAAs has been postponed for one year by the FCC.

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**Study Compares MCI  
And AT&T Charges**

RAMSEY, N.J. — Digital transmission over distances more than 50 miles tends to be "substantially less expensive" via Microwave Communications Inc. (MCI) than with telephone company rates.

This is one of the points made in a "Comparative Analysis" of MCI/AT&T rates issued by the Center for Communications Management. The study details the basic service options available to MCI users between Chicago and St. Louis and compares the costs of these services with comparable Bell offerings.

Under 50 miles, the MCI rates exceed those of Bell in many of the services, the study shows. The comparative analysis is available from the center at 283 Norman Drive, 07446.

**Multiplexer Handles  
9,600 bit/sec Data**

NEWTON, Mass. — Codex Corp. has a bit interleaved multiplexer to handle synchronous data at speeds from 1,200 to 9,600 bit/sec.

The 880 lets the user assemble multiple data channels into a single high-speed trunk at speeds up to 50 kbit/sec, the company said. The multiplexer has "programmable" data rates for channel reconfigurations to meet the needs of users whose transmission requirements change frequently.

Available options are a remote buffer feature priced at \$300/channel and "trackers" to accept data from an asynchronous source such as an FSK signal, the firm said. The tracker is priced at \$200/channel.

A typical configuration of the main 880 unit with two channel modules costs \$2,600. Codex is at 15 Riverdale Ave., 02195.

**Low-Speed 403-Type Modem  
Can Handle Voice Answers**

SAN DIEGO — A low-speed data set, compatible with Bell 403 modems, has been introduced by Metrolab Inc.

Designated the 403-D6, the Metrolab system consists of eight modems which comprise a complete system with enclosure and power supply.

The Bell 403 modem operates at 40 bit/sec and is used primarily with voice response applications.

The 403-D6 decodes conventional two-of-eight Bell tone frequencies, and standard or special output decoding methods can be provided. The system costs \$6,400 and is available on a 45-day delivery schedule. Metrolab is 10457 Roselle St., 92121.

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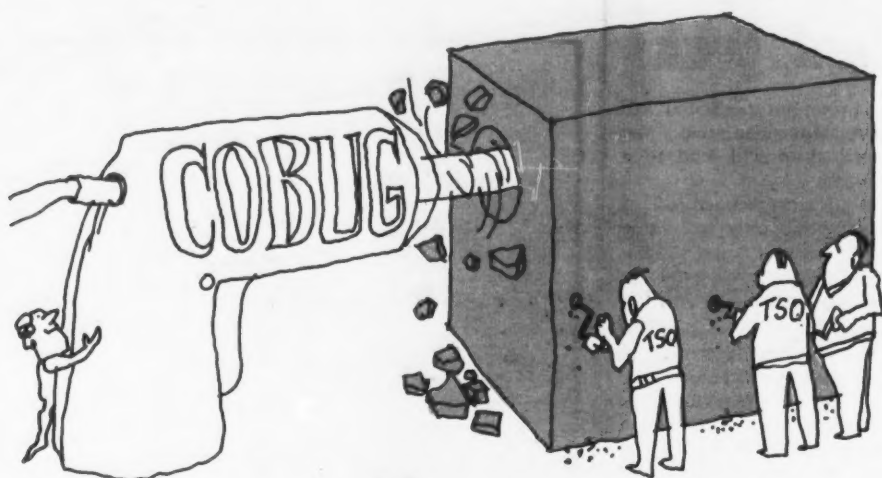
the idea that PDP-8 comes from a big computer company. With over 1400 sales/service engineers scattered all over the world.

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## EDP Auditors Association Focuses On Interrelation of Two Fields

LOS ANGELES — "The financial community is slowly becoming aware that auditors must

The association will meet April 11 here, with an informal discussion of valuing software for tax purposes.

More information is available from Jack Coates, Southern Permanente Services, Inc., 1515 No. Vermont Ave., 90027.

### Societies

upgrade their expertise to include knowledge of data processing," according to Howard Friedman, vice-chairman of the recently reorganized EDP Auditors Association.

"Data processing people, in turn, should be aware that methods and practices previously coveted as their private domain will be subject to increasingly more analytical scrutiny by internal and external auditors," Friedman continued.

The association's objectives are to communicate ideas and knowledge in the fields of EDP and auditing. It intends to promote education in the two fields, the exchange of ideas on auditing of EDP systems, auditing systems through EDP, and reviewing and auditing the management and operations of EDP installations.

### Data Communications ACM Symposium Topic

COLUMBUS, Ohio — "Data Communications in Data Processing" is the theme of the Central Ohio Association for Computing Machinery's Sixteenth Annual Symposium here April 14.

Dixon Doll will speak on "The State of the Art Today in Data Communications" and representatives from local DP service industries will discuss their use of data communications.

Reservations, which cost \$20, should be sent to Dan Owens, E.S. Preston Associates, Inc., 939 Goodale Blvd., 43212.

### User Group Formed By Boole & Babbage

CUPERTINO, Calif. — With the establishment of a users' group, Boole & Babbage hopes users "may be able to expand on the optimization techniques presently used in their installations' operations, and also provide Boole & Babbage with a broader understanding of their needs in utilizing computer performance measurement products and services," noted company representative David Morley.

The group recently held its first meeting, and elected David Schumacher of Lockheed Corp. as president.

### Call for Papers

1972 FALL JOINT COMPUTER CONFERENCE, Dec. 5-7, Anaheim, Calif.

The conference theme is "The Coming of Age."

Papers are invited dealing with user applications and requirements, facilities management, measurements, analysis and evaluation, computers in banking, simulation of user oriented systems configurations, computers in retailing, reliability, social issues, as well as hardware and software advancements, terminals and communications.

Six copies of the unpublished paper, a 100 to 200 word abstract and a draft not exceeding 6,000 words should be sent by May 1 to Donald A. Meier, Technical Program Chairman, P.O. Box 835, Hawthorne, Calif. 90250.



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# USC Plans Undergraduate DP Program

LOS ANGELES — Growing DP career opportunities for college graduates in business, industry and teaching are the prime reasons the University of Southern California is planning an under-

graduate curriculum in computer science, starting next fall, according to Dr. Jack Munishian, chairman of USC's Computer Science Program.

USC's graduate degree pro-

grams in computer science will continue, Munishian said. The new curriculum will lead to a Bachelor of Science degree and will be offered jointly by USC's



## Programmers Compete

Participants in the Third Annual Regional Programming Championship load their program decks on Texas A&M University's 360/65. Three problems were posed for the competition and teams from area colleges created solutions in Fortran IV. Judging was based on total elapsed time and number of runs required to obtain solutions. Rice University placed first, and Southern Methodist came in second.

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## Education

department of electrical engineering and mathematics and the computer science program.

Candidates for the undergraduate program must have at least three and-a-half semesters of math, including algebra, plane geometry and trigonometry and a semester of science as part of their high school background, USC said.

First-year students will have to carry courses in calculus and physics along with one semester classes in DP fundamentals and in assembler language. Cobol and Fortran won't be introduced until the second year, according to Munishian.

## Honeywell Lends CPU to Prisoners

WALPOLE, Mass. — An HIS Model 55 will be "permanently loaned" by Honeywell Inc. to a group of programmers at the local Massachusetts Correctional Institution. The computer is being delivered in May for the use of inmates who have been learning programming from Honeywell volunteers since the summer of 1967 as part of a rehabilitation program.

The inmates teach programming to other prisoners and also do programming for various state agencies. State officials estimate the inmates have saved Massachusetts more than \$700,000 over the past four years.

## Asis to Referee Student Contest

WASHINGTON, D.C. — To encourage effective reports on work being done by students, the American Society for Information Science (Asis) is sponsoring a contest in which papers submitted will be evaluated by the referee staff of the *Asis Journal*, using the same standards it applies to any manuscript.

Papers may be on any topic of interest to information scientists, but the contest is limited to Asis student members. Closing date for submission of papers is May 1. Entries should be sent to: 1140 Connecticut Ave., N.W., 20036.

## Allen-Bradley Offers No-Cost N/C Classes

HIGHLAND HEIGHTS, Ohio — Courses in numerical control systems have been scheduled by the Customer Training School of Allen-Bradley Co.'s Systems Division. Offered free to OEM and N/C user personnel, each two-week course qualifies the student to service the respective Allen-Bradley N/C system without jeopardizing warranties.

The school is at 747 Alpha Drive, 44143.

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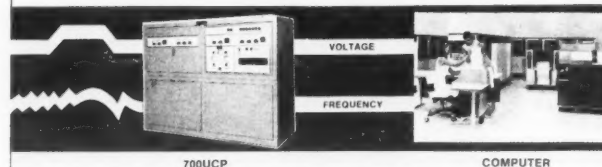
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## Keypunch Error Bungles Class Schedule

By Molly Upton

Of the CW Staff

BURBANK, Calif. — Many junior year students at Burbank High School were surprised to find they had not been scheduled for classes in the second semester. Specifically, all 108 students whose last names began with A, B or C found themselves among the missing on the new schedule.

Despite big headlines in the local paper, the *Burbank Review*, citing "Errant Computer Erases... Students," the computer, a Honeywell 2200 at the Los Angeles County Schools Office, was innocent. A keypunch error struck again.

Documents generally are received by the office in alphabetical order, and distributed to keypunchers, explained Joe Jeffries, DP director. One keypuncher handling student's requests for schedules used the wrong set of instructions when punching. These cards were verified, according to the same set of instructions. The names simply did not appear on the output, which was checked by

the Burbank High School and then put into final form. "They just didn't check totals," Jeffries noted.

The format has been used manually, by the office for five years, and "this has never happened. This is the kind of thing that gets to you," Jeffries said.

Errors are always going to occur in student scheduling, he said, because of sloppy handwriting, or wrong course numbers put on the slips by the student.

"It happens every time and there's no way you're going to stop it unless you have someone sit down, look at every number, and interpret what the numbers are and know the kid and what he wants," he said.

Keypunching is more conducive to accurate input than mark sensing, according to Jeffries. "No matter who you have to mark sense it, mistakes will be made, and the amount of problems are far less if you have a written document and keypunch from that. It takes more time and costs more money, but the accuracy factor is much

greater, because our keypunchers will question some of the glaring inconsistencies, such as a male enrolling in girls' PE."

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### Fun-Filled Computer Tells Where to Play

COLUMBUS, Ohio — Two researchers and a computer have developed a mathematical technique for locating urban playgrounds where they will serve the greatest number of youngsters.

Norbert Dee of Battelle's Columbus Laboratories and Jon C. Liebman of Johns Hopkins University carried out their study through a Public Health Service In-Training Grant.

"Urban recreation needs are not being met adequately by the existing supply of parks and playgrounds," they said.

Factors which the researchers integrated into a mathematical model designed for playground location included: ages of area children, availability of competing recreational activities, income of parents, quality of existing facilities and playground supervision availability.

They were able to ideally locate a system of playgrounds which would correspond in size and features to the needs of children in the various neighborhoods.

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## The Format

Each Day 9:00-9:40 Keynote address by a nationally known expert — an independent, not a vendor — on the day's main subject. Sets the stage for discussions.

9:40-10:30 Panel discussion led by regional experts chosen for their progressive management principles. Questions encouraged.

10:40-11:45 Workshops — panel members conduct separate workshops. Your specific questions fielded, worked out.

12:15-1:30 Conference luncheon — keynote speaker summarizes chief points covered during panels and workshops.

1:00-7:30 Exhibits open, stay open 'til 7:30. Exhibitors will show the latest in hardware, software, services.

## The Subjects

### First Day: Data Entry

Keynote speaker; Lawrence Feidelman, President, Management Information Corp., Cherry Hill, N.J.; Editor, *Data Entry Today*.

*Panels and workshops will be grouped by these four subjects:*

- Keypunch replacement; key to tape, disc and cassette devices.
- OCR.
- Intelligent terminals — distributed processing.
- Direct data entry/source data automation.

### Second Day: Data Communications: The Choices

Keynote speaker; Dr. Dixon Doll, Data Communications Consultant, faculty member, Graduate School of Business, Eastern Michigan University.

*Panels and workshops will be grouped by these four subjects:*

- Communications equipment from main-frame makers and common carriers.
- Communications equipment from independent suppliers.
- Data transmission via private (lines, microwave) networks.
- Data transmission via carriers (lines, microwave).

### Third Day: Operational Efficiency

Keynote speaker; Charles Lecht, President, Advanced Computer Techniques, N.Y., N.Y., author of *The Management of Computer Programming Projects*.

*Panels and workshops will be grouped by these four subjects:*

- Core extensions.
- System/utility software modifications.
- Independent peripheral usage.
- Dedicated systems vs. general purpose computers.

### Panel Members & Workshop Leaders

The regional experts who will run the panels and workshops have been chosen from a wide range of firms and institutions. Some will participate in more than one session, depending on their experience and expertise.

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\*Monday-Wednesday Schedule

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# computer industry

a Computerworld news section about the nation's fastest growing industry

April 5, 1972

Page 29

## CI Notes

### Telex, Calcomp Sign Pact

TULSA, Okla. — Telex will purchase an undisclosed amount of IBM-type 3330 disk subsystems from Century Data Systems, a Calcomp subsidiary. Telex also buys 3330-like units from Information Storage Systems, a subsidiary of Ite. According to Telex President S.J. Jatras, "We can purchase this equipment in today's market at prices below what we could manufacture the units."

### Consolidated Gets Backing

LONDON — Consolidated Computer, the key-to-disk firm that ran into severe cash problems last year, has a new infusion of capital from the Canadian Government, the government of Ontario and a marketing agreement with ICL that will permit it to continue in business.

Under the ICL agreement, Consolidated received an order for almost \$15 million worth of equipment and ICL will take over Consolidated's marketing force in Britain and will be responsible for all marketing outside the U.S. and Canada.

### CSC Lands U.S. Contract

WASHINGTON, D.C. — Computer Sciences Corp. will develop a data base for federal agencies and provide those agencies with a nationwide teleprocessing network under a contract valued at \$43 million from the General Services Administration.

The contract is expected to save the government 40% over prices currently being paid to several sources, GSA said. The data base will be made up of commonly used government information such as population and price figures.

### Clarification

References to the lack of compatibility of dual density drives to IBM 2314 drives in an article on Control Data Corp. [CW, March 29], were not intended to give the impression that disk packs written on a 2314 could not be read on the dual-density units. The incompatibility lies in the inability of a 2314 drive to read a dual-density pack.

### Supershorts

Honeywell Inc. has been awarded a \$12.9 million contract to supply 10 large-scale Series 6000 computer systems to major Navy shipyards on both coasts and in Pearl Harbor.

Sanders Data Systems has been accepted as an authorized contractor by the U.S. General Services Administration Federal Supply Service.

McDonnell-Douglas has selected Control Data Corp. as its data processing supplier for the Prototype Demonstration Program for Site Defense of Minuteman (SDM). The equipment includes the CDC Cyber 70 Models 73, 76 and 77, valued at over \$30 million.

The Federal Aviation Administration said last week that more than half (33) of the new computerized automated radar terminal systems (Arts III) have been delivered.

## Some Doubts Remain

# Memory Makers Hail Maintenance Win

By E. Drake Lundell Jr.  
Of the CW Staff

SAN FRANCISCO — Extended core memory manufacturers are hailing the "stipulated judgment" in the Advanced Memories — Ite suit against IBM [CW, March 29] as a victory for the entire industry.

But at the same time, several industry sources said last week the victory may be short-lived and it is too early to predict all the results of the decision.

"IBM has told us that they will treat us in the same manner they are treating Ite under the judgment," according to Roger

Goetz, marketing vice-president for Computer Investors Group, which markets the extended memories manufactured by Data Recall.

"It seems that they will treat all of the extended memory makers in a similar manner after reviewing the situation with each of them individually," he added.

### Redefines Procedures

Basically, another extended memory maker said, the agreement just redefines the procedures in effect with other multiple supplier systems — IBM will maintain its part of the machine and the

independent is responsible for his part.

"That's all we ever wanted anyway," he added.

Most of the firms in the extended memory business felt the judgment — with the court retaining jurisdiction over the case — would make it easier for independents to work with IBM on maintenance of future products.

"I think that in the future these problems will be worked out on a manufacturer-to-manufacturer basis," Goetz said, "and the user will not get involved like he did this time."

"With the judgment and the court's apparent friendliness to the independent's case, I think that IBM will be more ready to negotiate in the future than they were in the past," another source in the extended memory business added.

At the same time, independent peripherals producers are somewhat concerned over how the "best efforts" maintenance agreements will be interpreted by IBM salesmen when dealing with customers.

### 'Pretty Risky'

"The salesmen can make the 'best efforts' sound pretty risky to a user if they want to," one spokesman for an independent said. If they really try to, they can probably scare off some users from turning to independent peripherals by making maintenance sound troublesome — what user wants to have problems with maintenance of 90% of his system just to be able to upgrade the other 10%, he asked.

"I'm worried that enough users have already been scared away from independent peripherals by the IBM moves," another observer said, "so the agreement might be too late to allay their fears."

## Memorex Mainframe Move Seeks To Reduce Dependency on IBM

SANTA CLARA, Calif. — Memorex officials claim the firm's entry into the mainframe computer business is part of an effort to reduce its dependence on IBM policies, but several industry sources are questioning the company's ability to compete in the mainframe business.

"We want to get out from under IBM's heel," according to E.E. Faber, director of marketing services for the firm which recently announced two mainframes, the forerunners of a planned, complete computer line [CW, March 29].

### IBM the Dictator?

IBM, Faber said, is affecting customers in two ways. It is antagonizing its users by adopting a dictatorial stand and it is also frightening them by not allowing them to use diagnostic routines, he said.

The user, therefore, is prone to think twice before moving away from IBM to independent peripherals, he said. This could be minimized, Faber claims, by peripherals manufacturers supplying services and support that are withdrawn or withheld by IBM.

Several industry sources and financial analysts, however, have questioned whether Memorex can finance the devel-

opment and lease of the new series of computers.

They point out that Memorex has been losing money lately, and that the mainframe lease business requires a great deal of capital — capital which is tied up for several years before the firm would begin to make money in the lease business.

But D. James Guzy, Memorex executive vice-president, claims the firm has enough money to finance the program through the first half of this year. After that, however, Memorex will have to seek other financing, he said.

The firm would not reveal what other routes of financing it was considering.

To date, Memorex has poured \$6 million into the development of the computer line, Guzy said, and expects to put \$4 million more into the effort before first deliveries begin this August.

## Afips Adds Exhibitor Services In Move to Lift Booth Sales

MONTVALE, N.J. — Companies exhibiting at the Spring Joint Computer Con-

ference in Atlantic City this year will find several new services available from the American Federation of Information Processing Societies (Afips), sponsor of the semiannual conferences.

The moves are part of an Afips program to combat shrinking booth sales and slipping attendance by offering more services to exhibitors and attendees.

For the first time, Afips will supply exhibitors with registration lists of the attendees at the conference. Both the total list and lists covering specified categories will be available, including individual names, titles and complete addresses.

The organization is also going back to a one-day registration policy in order to boost attendance, with a one-day ticket for the entire conference priced at \$15 and an exhibits-only registration available for \$5.

Afips is also sponsoring a World Trade Day in conjunction with this year's spring show.

Slated for May 17, the program will start with an address by Richard Garmitz, director of the Foreign Export Promotion Program of the Department of Commerce.

The program will feature a three-hour seminar on overseas marketing conducted by Commerce specialists on Europe, Latin America, Japan and Eastern Europe.

### In Terms of Shipments

## Burroughs Claims It's Number 2

DETROIT — During 1971, Burroughs recorded the highest percentage gain in the value of shipments in the industry, President Ray W. Macdonald said at the annual shareholders meeting.

Citing "impartial industry observers," he added that the company is now ranked number two in terms of the value of annual U.S. computer shipments, compared with fourth place in 1969, while retaining fourth place in shipments outside the U.S.

### 17% Increase

Burroughs worldwide incoming order rate picked up during the second half of 1971, showing a 17% increase, compared with a 3% rise during the first half. Incoming orders during the year were 9% higher than the previous year.

Worldwide order backlogs at the end of 1971 declined 6% from the previous year, but "remained at a high level — approaching \$700 million," according to Macdonald.

The discontinuance of existing DP ren-

tals was negligible, Macdonald said, although the company did experience a "higher than normal rate of order cancellation."

### Leased Systems

An increased emphasis on leased systems, coupled with a decline in purchase revenue, resulted in a 3% revenue increase from DP products to \$414 million. Rental and service income grew 22% while purchase revenue declined 12%, he said.

Orders for DP equipment in 1971 set records, Macdonald said. Orders rose 18% over 1970, while the product group of commercial minicomputers, accounting machines and small applications machines showed a 5% order growth.

The number of systems ordered rose by 22% over 1970, which in turn showed a 23% growth over 1969.

For the second consecutive year, revenue growth from the product group including minicomputers, accounting machines, calculators and small applications machines scored a 9% increase.

## DEC Offers \$895 Microprocessor

MAYNARD, Mass. — Digital Equipment Corp. has announced the PDP-16/M microprocessor, that lists for \$1,995 or as low as \$895 without chassis and power supply in quantities of 200. First deliveries are scheduled for this month.

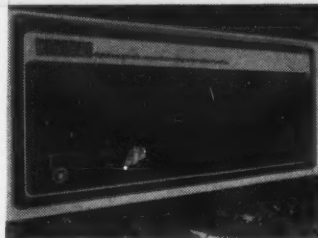
The PDP-16/M incorporates four basic and modular subassemblies, one each for programming functions, memory storage, arithmetic operations and I/O control that can be plugged into it. Space is also reserved within the computer chassis for up to 1K of control ROM, 1,536

supplies (LXD-CC-152 and LXD-D-152), which contain Lambda's power hybrid voltage regulator, are available in standard CC and D package configurations and provide the voltage and current ratings usually required for EDP machine applications. A triple-output supply (LXT-D-5152) is available in the D package.

The Syscom Card Reader/Scanner Assembly from AMP, Inc., Harrisburg, Pa., is a static card reader with 80-column card capability and high-speed char-

acter serial, bit parallel data sequencing. The scanning rate, adjustable from 10 to 2,000 char./sec, can provide an output data rate equivalent to a 1,500 card/min serial card reader, the company said. Compatible with DTL and TTL logic, output levels are 0 and +5 Vdc.

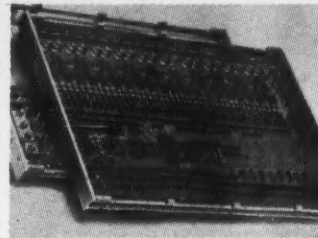
A timing and tape search system, offering all features found in separate generator/translator and tape search units, is available from Datatron Inc., Santa Ana, Calif. The Datatron Model 3030 Time Code Generator/Transla-



DEC's PDP-16/M Microprocessor.

tor/Tape Search Unit permits significant economies in space and acquisition cost by combining its multiple functions in a single unit designed to work as a computer-controlled timing and tape search system, the company said.

MFE Corp. of Wilmington,



New Fabritek Core Memory.

Mass., has an integrated analog/digital strip chart recording system to allow the printing of a continuous line of alphanumeric or special characters without interruption of the analog record, the company said.

Prices of the digital printer accessory start from \$300. OEM discounts are available.

### New OEM Products

words of solid state RAM, 280 words of data ROM, 33 high-speed registers, six control flags, two serial I/O channels and three parallel I/O channels.

#### Fabritek Adds Core Memory

MINNEAPOLIS — A new core memory, the Model 688 from Fabritek Inc., features a 20-bit word in capacities of 32K (or 65K by 10-bits) on a single 15 by 21.5-in. board. The Model 688 may be field-expanded to 65K, 128K, 256K or 512K with up to eight modules operating from a single timing and control assembly. Full cycle time is 1.2  $\mu$ sec with 500 nsec access time. Model 688 architecture is 3D, 3-wire.

#### Other New Products

An OEM 80-column card reader with read rates up to 600 card/min is available from True Data Corp., Newport Beach, Calif.

The Model 600 Card Reader includes a proprietary assembly that uses only one moving part and a reflective fiber optics reader head. Standard TTL/DTL circuitry allows the Model 600 to be interfaced with virtually any existing controller, the firm said.

The Model 600 costs \$1,495 for single units in basic assembled form. The 100-unit price for the complete reader assembly is \$1,185.

A low-cost solid-state light-emitting diode (LED) display is available from Hewlett-Packard to convert binary information to a base 16 number system automatically. The display, the 5082-7340 Hexadecimal Indicator, shows digits from 0 to 9 and letters A through F. Decoder/driver/memory electronics are built in. Price in quantities of 1,000 is \$12.25 per digit.

Lambda Electronics Corp., Melville, N.Y., has added dual and triple-output power supplies to its LX line. The dual-output

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**Institute for Future Says****Social Impact of Computer Technology Needs Study**

By Graham F. Wallace  
Special to Computerworld

"Information technology will have a more pervasive impact on society than any other technology developing today," according to Dr. Roy C. Amara, president of the Institute for the Future.

"The need to forecast its course and social impact is very great, and the task of doing so will become more difficult in the years ahead," he added.

The Institute was incorporated four years ago by a group of scientists concerned with the need to better understand and control the forces for change generated by society.

Although information technology is but one field of interest, it has received a lion's share of attention, according to Amara, both because of its broad influence, and because it offers new tools for future research.

In a study just completed for the Department of Commerce, the Institute estimated the potential market for two-way information services to private homes. Thirty specific services, which could be carried via two-way broadband cable, were considered over the period 1970 to 1990.

#### Educational Services

Estimating the aggregate mar-

ket for all thirty services at \$21.7 billion per year, or \$20.10/mo per average home, by the end of the period, the study found that educational services will account for 34% of the anticipated market, business conducted from the home for 23%, and services for general access to information for about 12%. Services in the three categories of shopping aids, entertainment and person-to-person communications will each account for

about 10%.

According to the study, the single service with the highest dollar value will be computer-aided school instruction in the home, with a value of \$4 billion/yr.

The single service used by more households than any other will be checkless and cashless transfer of funds, used by about 4.5 million of the estimated 90 million households in the late 1980s.

In another study, the Institute examined the future of the telephone industry over the period 1970 to 1985. The final report lists the following situations likely to prevail in 1985:

- A total of about eight million data terminals will be connected to the public and other domestic networks.
- About three million Picture-phones will be in use in the U.S. — two-thirds used mainly for data or information services.
- Between five and 30 new interstate carriers will have been authorized, and perhaps four special-purpose satellite systems will be in service.
- At least eight specialized data communication networks will serve about 235,000 terminals.

#### Social Changes

The study, sponsored by AT&T, not only forecast developments in networks and services, but also forecast changes in U.S. society, characteristics of the labor market and the regulatory environment of the industry.

Some of the conclusions drawn from the judgments of the panel of experts consulted on regulation were that:

- Regulatory conflict will greatly increase over the boundary between the regulated and the unregulated sectors of the industry.
- Telephone tariffs will be allowed to meet cream-skimming competition on high-density transmission routes.
- The Executive Branch, as opposed to the FCC, will take an increasing role in defining a national communication policy.

A current program of the Institute, Amara stated, is to create a computer-based communication network on which group assessment methods can be tried and developed.

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# COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY



## Team Named for NCR-CDC Firm

MINNEAPOLIS — Control Data and NCR have named the team to lead their new jointly owned company, Computer Peripherals, Inc., and Control Data has begun replacing Seymour Cray, who is retiring.

Paul J. Bulver, formerly vice-president and senior staff officer for engineering at CDC, will be president of the new firm. J. Thomas Oaster, controller of the Cambridge, Ohio, NCR plant, will be vice-president for finance of the new firm which will engineer and manufacture most peripherals used by the two firms.

James E. Thorton has been named vice-president of Control Data's Computing Development Laboratories and will also

■ John P. Breyer has been named executive vice-president, and Joseph L. Levy director of eastern region marketing for International Data Corp.

■ Arnold S. Kashar has been named vice-president and general manager of Sierra Research Corp.'s Computer Products Division.

■ Mervin Kronfeld, Greg J. Ehalt and Alan C. Kronfeld have been named vice-presidents of Nortronics Co., Inc.

■ Dallas L. Talley has been appointed vice-president of General Computer Systems.

■ Richard H. Lussier has been named vice-president, marketing, for Intel Corp.'s Computer Products Division.

■ John W. Schneider has been named vice-president, sales, of Systems Engineering Laboratories, Inc.

■ Daniel T. Carroll and Roger H. Morley have been appointed executive vice-presidents of Gould Inc.

■ John J. Dobson has been elected president and chief executive officer of Peripheral Dynamics Inc.

■ John M. McKnight has been named president of Orbital Systems, Inc.

■ William M. Cramer has been elected president and chief executive officer of Seaco Computer-Display Inc.

■ Lowell L. Sando has been named vice-president, systems programming, for Comten.

■ Charles S. Rockwell has been elected chairman and chief executive officer of Magnetic Head Corp. Rockwell was formerly president of the Sperry Gyroscope Division of Sperry Rand Corp.

### Executive Corner

serve as technical consultant to the firm's Computer Systems Group. Under his direction will fall the Chippewa (Wisconsin) Laboratory, the Advanced Computer Laboratory and the Communications Laboratory of the firm.

Robert L. Perkins has been appointed vice-president and senior staff officer for engineering at the firm.

#### Other Moves

■ Joseph W. Rooney has joined Intel Corp. as executive vice-president of the company's Data Processing Division. Rooney formerly was president of the Data Processing Division of RCA's Computer Systems Group, where he was responsible for marketing and maintenance of the RCA computer division.

■ Dewaine L. Osman has been appointed vice-president and general manager for Univac's Communications & Terminals Division.

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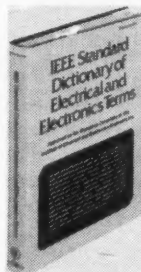
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\*Restricted to the continental United States.



## Acquisitions

Central Data Systems Inc. has acquired Computer Analysts Inc. (CAI) and its subsidiary, Compu-Center Corp. CAI is a consulting and systems development firm; Compu-Center provides DP services for banks and distribution companies. The transaction was for an undisclosed amount of cash.

International Data Resources, a Tampa-based software and facilities management firm, has acquired Data Control Systems, a Louisiana software company.

Time-Sharing Information Services, Inc. has acquired Time-Sharing Enterprises, Inc. and will continue to publish *Time-Sharing Today* and *Time-Sharing Directory*.

Western Union Corp. has acquired Computer Logistics Corp.

(CLC) from Com-Share for an exchange of stock. CLC is an information services firm specializing in warehousing operations.

Boothe Data Systems has agreed in principle to acquire Ancom Systems for 936,000 shares of Boothe common stock.

McDonnell Douglas Automation Co. has acquired AGT Management Systems, Inc. of Seattle, a software firm specializing in the business, education and government areas. The transaction was for an undisclosed amount of cash.

Data Research Corp. has agreed to purchase 1 million shares of International Data Terminals, Inc. from Western Union Corp. The transaction will give Data Research a 75% interest in International Data Terminals.

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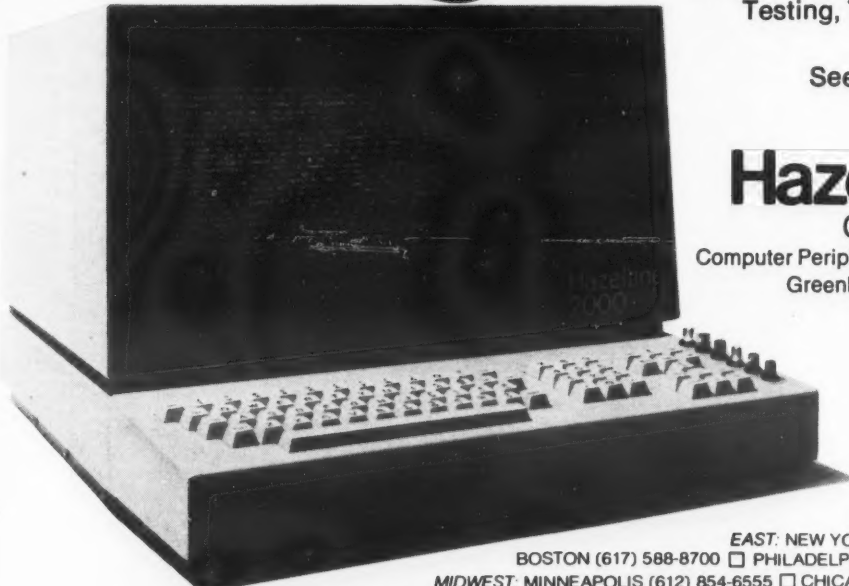
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## Fabri-tek Posts Profit for Nine Months

MINNEAPOLIS — With a boost from a \$2 million special credit, Fabri-tek Inc. showed a nine-month profit.

Without the special credit, the add-on memory maker managed to cut its losses despite a decline in sales. In the nine months ended Jan. 1, revenues fell to \$12.1 million from \$14.2 million for the same period a year ago.

Before the special credit, losses were \$1.6 million compared with a \$2 million loss in the same year-ago period. Earnings after the credit were \$412,300 or 13 cents a share.

The extraordinary \$2 million gain, or 64 cents a share, result-

ed from the sale of two subsidiaries, Fabri-tek Microsystems, Inc. and Nicolet Instrument Corp., and transactions in the company's debenture bonds.

Sales for the third quarter were nearly level, at \$4.1 million, and the loss was \$629,030 compared with a \$1.3 million loss in the

same quarter last year.

Shipments of extension memories continue to accelerate, according to L.D. Altman, executive vice-president. January shipments exceeded all previous monthly shipments and bookings for February 1972 are substantially higher.

## Nickels & Dimes

Scan-Optics privately placed \$2.5 million of 10-year, 8% notes and 15-year warrants for 450,000 common shares with a group of five institutional investors. Funds will be used to repay short-term debt and for working capital. The firm is seeking additional funds from a major lease-financing concern, a spokesman said.

\$\$\$

In an effort to reduce its debt and interest expense, Rockwood Computer will temporarily reduce the conversion price of its 7% convertible senior subordinated debentures to \$6.66 from the current \$61.44 between April 17 and May 16. The number of shares obtainable for a \$1,000 debenture will be increased to 150 from 16.

\$\$\$

Standard Register has converted its short-term indebtedness to long-term through two contracts totaling \$22 million. Northwestern Mutual Life Insurance Co. has signed a \$14 million, 15-year loan, with no principal payments to be made for six years. The second is a six-year, \$8 million loan by two banks.

\$\$\$

Electronic Associates Inc. reported a 7% increase in 1971 sales, to \$33 million from \$31 million, and earnings of \$1.1 million of 41 cents a share compared with last year's restated loss of

\$3.51 a share.

And Bresnahan Computer's first quarter earnings quadrupled, to \$150,000 or 8 cents a share from \$31,000 or 2 cents a share in the 1970 period. Revenues rose by \$33,000.

\$\$\$

Datametrics' earnings for the year ended Oct. 7 totaled \$75,148 or 19 cents a share, on sales of \$1 million, up from the loss of \$365,704 on sales of \$354,481 in 1970.

\$\$\$

Recognition Equipment's earnings for the first quarter ended Jan. 31 were \$310,000, or 6 cents a share, down from last year's \$602,000 or 12 cents a share. Revenues rose, however, to \$8.7 million from \$8.6 million.

\$\$\$

GE sold another large block of Honeywell stock it received in 1970 from the sale of its computer operations to Honeywell. Last June, GE sold 375,000 shares. GE told the Justice Department it would dispose of the 1.5 million Honeywell shares acquired in 1970 by the end of 1974.

\$\$\$

A 100% rise in revenues, to \$212,042, enabled Transnet to show earnings of \$19,006, compared with a loss of \$18,627 for the same six months ended Dec. 31, 1970.

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# Computerworld Stock Trading Summary

All statistics  
compiled, computed  
and formatted by  
TRADE-QUOTES, INC.  
Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, MARCH 30, 1972

E X C H	PRICE				
	71-72 RANGE (1)	CLOSE MAR 30 1972	WEEK NET CHNGE	WEEK PCT CHNGE	
SOFTWARE & EDP SERVICES					
O ADVANCED COMP TECH	1- 4	1 1/2	0	0.0	
A APPLIED DATA RES.	5- 13	5 7/8	+ 1/2	+9.3	
O APPLIED LOGIC	1- 3	1 3/4	- 1/4	-12.5	
N AUTOMATIC DATA PROC	44- 91	85 1/4	-1 1/4	-1.4	
O AUTO SCIENCES	1- 8	3/8	- 1/8	-25.0	
O COMPUTER DIMENSIONS	9- 17	10 3/4	0	0.0	
O COMPUTER NETWORK	2- 11	4 1/2	0	0.0	
N COMPUTER SCIENCES	6- 17	9 7/8	- 3/8	-3.6	
O COMPUTER TECHNOLOGY	4- 11	6 1/4	+ 1/4	+4.1	
O COMPUTER USAGE	5- 16	12 5/8	+ 1/2	+4.1	
O COMP AUTOMOT REPORTS	6- 13	7	0	0.0	
N COMPUTING & SOFTWARE	17- 45	23 3/4	-1	-4.0	
O COMRESS	1- 4	2 1/4	- 1/8	-5.2	
O COMSHARE	4- 10	9 5/8	+ 1/2	+5.4	
O DATA AUTOMATION	1- 4	1/2	0	0.0	
O DATA PACKAGING	6- 10	8 7/8	0	0.0	
O DATAMATION SERVICE	1- 3	3/4	0	0.0	
L DATATAB	3- 8	7	- 7/8	-11.1	
O EDP RESOURCES	5- 16	5 1/8	- 1/8	-2.3	
A ELECT COMP PROG	2- 7	3 3/4	+ 1/4	+7.1	
N ELECTRONIC DATA SYS.	34- 85	60	+1 3/8	+2.3	
O INFORMATICS	6- 15	9	0	0.0	
O I.O.A. DATA CORP	1- 3	2 1/8	0	0.0	
A ITEL	7- 23	10 1/2	- 3/8	-3.4	
O KEANE ASSOCIATES	4- 14	4 3/4	+ 1/4	+5.5	
O KEYDATA CORP	5- 14	9 5/8	+ 5/8	+6.9	
O LOGICON	5- 9	8 1/2	+ 5/8	+7.9	
A MANAGEMENT DATA	5- 11	8 1/4	- 1/8	-1.4	
O NATIONAL CSS INC	7- 14	12 1/4	0	0.0	
O NAT COMP ANALYSTS	1- 4	3/4	+ 1/8	+20.0	
P ON LINE SYSTEMS INC	7- 18	11 1/4	+2	+21.6	
N PLANNING RESEARCH	10- 26	14 3/4	- 3/8	-2.4	
O PROGRAMMING METHODS	16- 29	22 1/2	- 3/4	-3.2	
O PROGRAMMING & SYS	1- 4	1 1/2	0	0.0	
O SCIENTIFIC COMPUTERS	2- 4	2 3/4	- 1/4	-8.3	
O SIMPLICITY COMPUTER	1- 4	4 1/8	- 1/8	-2.9	
O SOFTWARE SYSTEMS	1- 3	1 3/8	0	0.0	
O TBS COMPUTER CENTERS	4- 9	5 1/8	+ 1/8	+2.5	
O TOLLEY INTL CORP	3- 8	10 3/4	+ 3/4	+7.5	
O TRACOR COMPUTING	2- 5	1 7/8	+ 1/8	+7.1	
O TYMSHARE INC	4- 15	7 1/2	- 1/4	-3.2	
O UNITED DATA CENTER	2- 8	7	0	0.0	
N UNIVERSITY COMPUTING	14- 38	20 1/8	-1 1/8	-5.2	
A URS SYSTEMS	5- 11	7 5/8	+ 1/4	+3.3	
O VORTEX CORP	2- 6	5	0	0.0	
PERIPHERALS & SUBSYSTEMS					
N ADDRESSOGRAPH-MULT	24- 48	38	- 5/8	-1.6	
O ALPHANUMERIC	1- 6	1 1/8	0	0.0	
N AMPEX CORP	8- 25	7 3/4	- 1/4	-3.1	
O ANDERSON JACOBSON	5- 10	6 1/8	+ 1/8	+2.0	
O ATLANTIC TECHNOLOGY	3- 9	5 1/2	-1	-15.3	
A BOLT, BEIANEK & NEW	4- 13	12 1/8	-1 1/8	-8.4	
N BUNKER-RAMO	6- 17	11 3/4	+ 1/4	+2.1	
A CALCOMP	14- 33	20 3/4	-1	-4.5	
O COGNITRONICS	2- 9	3 1/4	0	0.0	
O COMPUTER COMMUN.	5- 19	5 5/8	0	0.0	
A COMPUTER EQUIPMENT	3- 7	4	+ 1/4	+6.6	
A COMPUTEST	4- 20	6 3/4	- 1/2	-6.8	
O CONSOL COMPUTER LTD.	1- 12	1/2	0	0.0	
A DATA PRODUCTS CORP	3- 10	5 3/8	- 1/8	-2.2	
O DATA RECOGNITION	3- 8	3 3/4	- 1/4	-6.2	
O DATA TECHNOLOGY	3- 9	3 1/2	0	0.0	
O DI/AN CONTROLS	3- 7	6	0	0.0	
O DIGITRONICS	2- 8	3 1/4	- 1/4	-7.1	
N ELECTRONIC M & M	5- 16	6 1/4	- 7/8	-12.2	
O FABRI-TEK	2- 5	4 1/2	+ 5/8	+16.1	
O GENERAL COMPUTER SYS	6- 16	12 1/2	- 1/4	-1.9	
N GENERAL ELECTRIC	53-124	64 5/8	+ 1/8	+0.1	
N HAZELTINE CORP	6- 13	10 5/8	- 5/8	-5.5	
O INFOREX INC	17- 49	36	+4	+12.5	
O INFORMATION DISPLAYS	3- 8	3 1/4	0	0.0	
O MANAGEMENT ASSIST	1- 2	1 1/4	0	0.0	
A MARSHALL INDUSTRIES	7- 27	12 3/8	- 5/8	-4.8	
N MEMOREX	20- 78	29 3/4	-2 1/4	-7.0	
A MILGO ELECTRONICS	12- 34	31	- 1/2	-1.5	
N MOHAWK DATA SCI	15- 47	23 5/8	-1 3/8	-5.5	
O OPTICAL SCANNING	6- 18	11 1/4	- 3/4	-6.2	
O PERTEC CORP	9- 18	14 1/8	- 3/8	-2.5	
O PHOTON	6- 15	13 1/2	+ 3/8	+2.8	
A POTTER INSTRUMENT	11- 25	17 1/8	- 1/4	-1.4	
O PRECISION INST.	7- 16	7 3/4	- 1/4	-3.1	
O RECOGNITION EQUIP	9- 26	11 3/8	+1 1/8	+10.9	
O REDCOR CORP.	1- 9	1/8	0	0.0	
N SANDERS ASSOCIATES	9- 22	19 1/2	- 5/8	-3.1	
O SCAN DATA	6- 15	10 3/8	+ 1/8	+1.2	
O SYCOR INC	3- 11	8 1/4	0	0.0	
O TALLY CORP.	6- 16	10	- 1/4	-2.4	
N TEKTRONIX INC	28- 47	47 3/8	+3 5/8	+8.2	
N TELEX	8- 22	12	- 7/8	-6.7	
SUPPLIES & ACCESSORIES					
N ADAMS-MILLIS CORP	9- 19	10 3/8	0	0.0	
O BALTIMORE BUS FORMS	6- 10	5 3/4	- 3/4	-11.5	
A BARRY WRIGHT	7- 13	11 1/8	+ 1/8	+1.1	
A DATA DOCUMENTS	14- 29	21 3/4	-1 1/4	-5.4	
O DUPLEX PRODUCTS INC	8- 16	15 1/4	+1 1/8	+7.9	
N ENNIS BUS. FORMS	5- 13	8	- 1/8	-1.5	
O GRAHAM MAGNETICS	9- 35	22 3/8	+ 1/8	+0.5	

## Earnings Reports

### BRADFORD COMPUTER & SYS

	1971	a1970
Shr Ernd	\$5.50	\$3.35
Revenue	12,815,693	9,762,454
Tax Cred	99,700	.....
Earnings	c1,638,810	1,063,563

a-Restated to reflect the acquisition of Bradford Mutual Fund Services Inc., in May 1971, on a pooling-of-interests basis. b-Based on income before tax credit. c-Equal to 53 cents a share.

### NCR

	1971	1970
Shr Ernd	\$0.04	\$0.137
Revenue	1,465,701	1,420,576
Earnings	1,284	30,246
3 Mo Shr	.....	.....
Revenue	400,625	420,899
Earnings	(15,686)	1,065

a-The company noted that its fourth quarter loss reflects the effects of year-end write-offs of \$17 million and a 16-week strike, which resulted in an estimated \$10 million after-tax adverse impact on 1971 earnings.

### CONTROL DATA

	1971	1970
Shr Ernd	\$2.37	.....
Revenue	571,187,848	\$539,534,242
Spec Cred	72,801	819,738
Earnings	b35,780,891	(3,208,710)

a-Based on income before special credit. b-Equal to \$2.37 a share. The report notes that due to a depreciation change on Jan. 1, 1971, earnings were increased by approximately \$7.9 million, or 55 cents a share.

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